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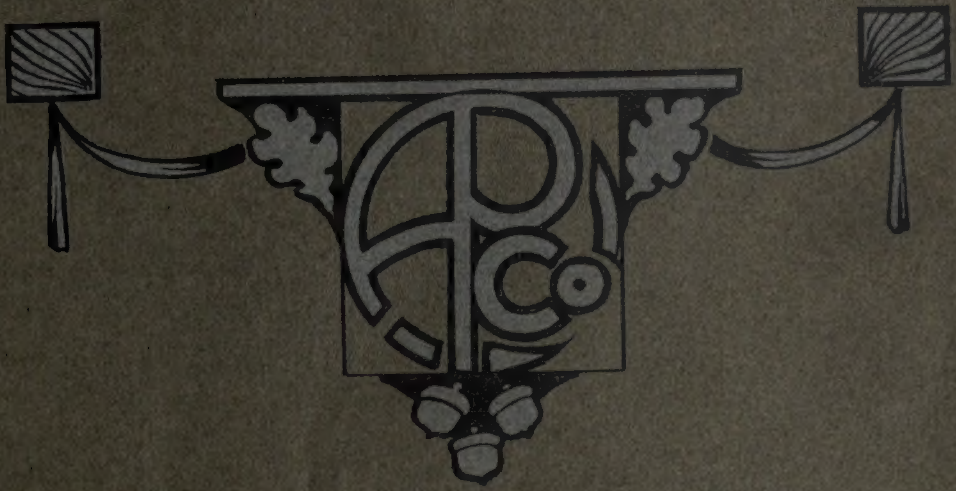

THE
ACTON PUBLISHING CO., LTD.
TORONTO. MONTREAL.

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INTRODUCTION

There are two ways of launching a new journal. One is to give away sufficient advertising, or sell it at a ridiculousty low rate, in order to produce the impression of immediate success, or a long felt want well filled.

The other is to commence the way it is intended to continue—every advertisement a contract, giving a square deal to all.

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Our motto is service. Service both to the subscriber and advertiser. We guarantee the subscribers service in our reading columns, many times that of the subscription price. Our subscribers can assist in rendering service to the advertisers by reading the first twelve pages of this issue and—enough said.

The
The Builder & Contractor

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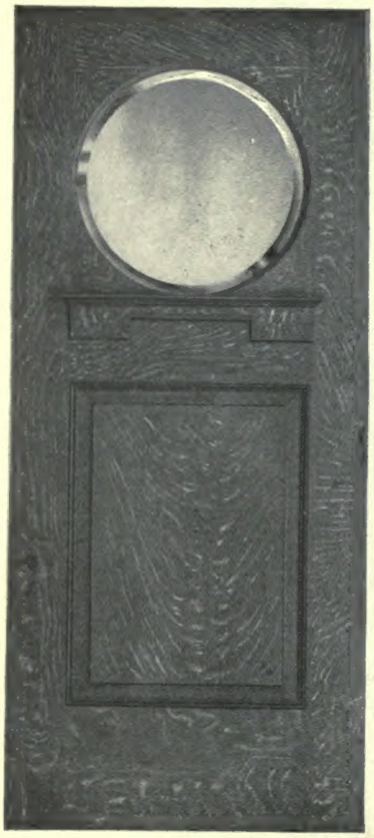

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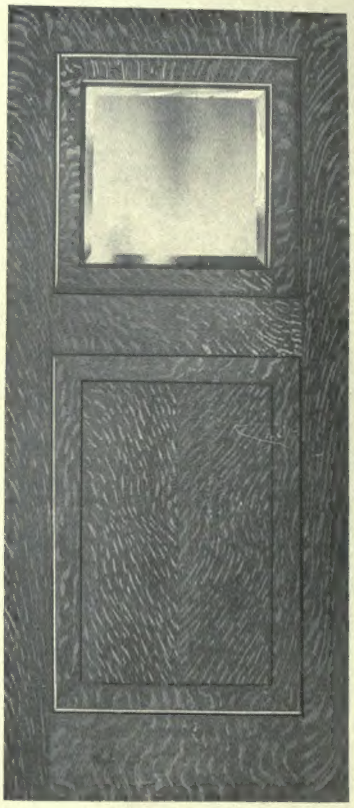

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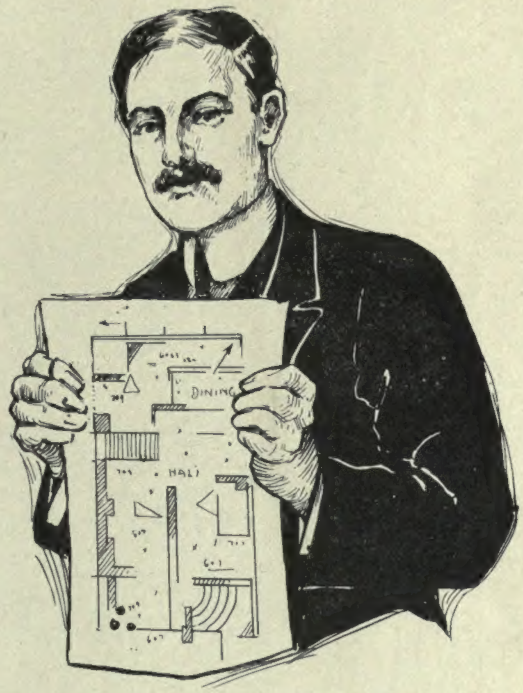

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The building season is now on.

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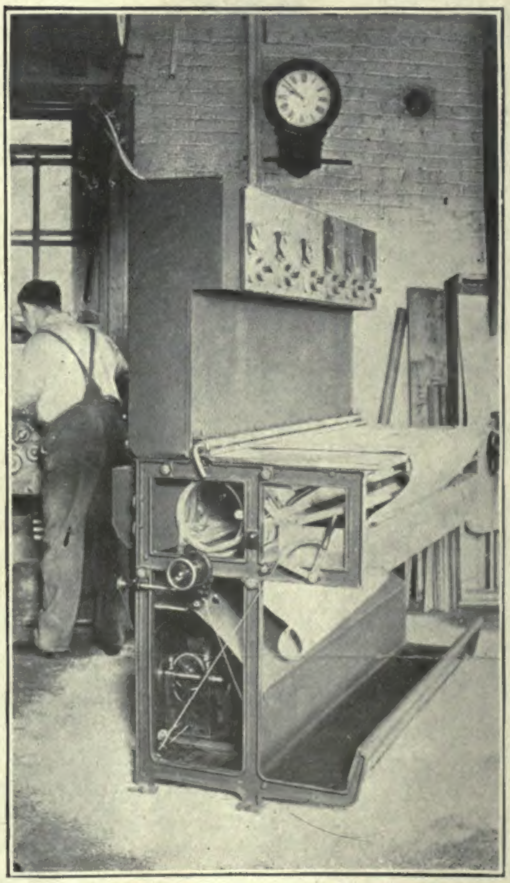

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Twenty Years Ago the Best—the Best To-Day

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We are the Leaders in these line
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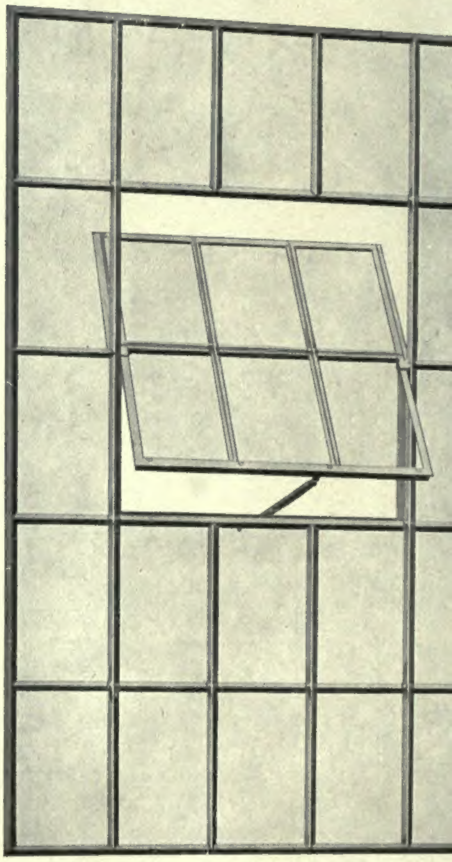

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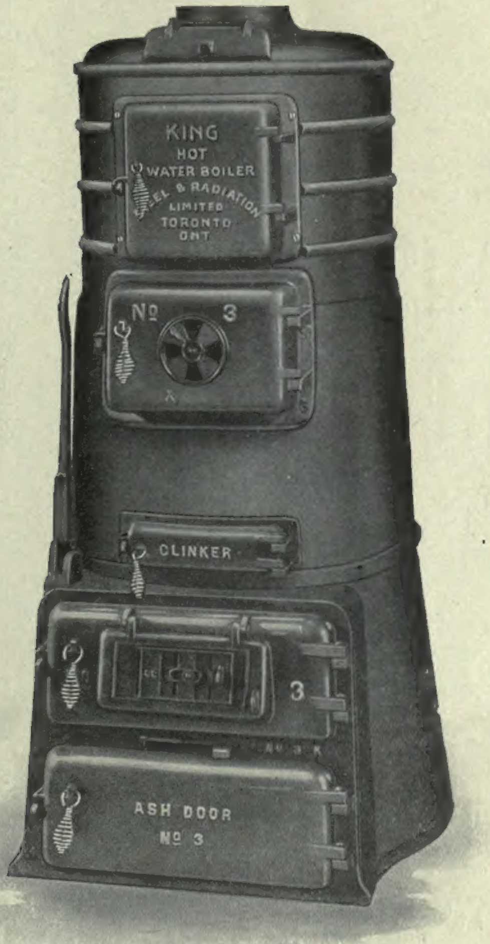

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"KING" Boilers and "KING" Radiators

In this **New Boiler** we set ourselves the highest possible standard, with the result that the completed Boiler has more than fulfilled our expectations.

The special design of the Combustion chambers and water ways guarantee the maximum heat for the minimum fuel consumption.

We wish to draw special attention to the operation of the grates which is entirely new in the construction of shaking apparatus and is a decided improvement over all others.

These are only a few of the many special features peculiar to "KING" Boilers.

Call at our Show Rooms and let us explain them to you.

his radiator is well and favorably known or the excellence of its materials and construction, the sections being joined together vith malleable screw nipples.

Ve guarantee every Radiator that leaves ur works, not only against defect or leakage, ut also that they contain the full amount of leating Surface Catalogued.

KING" Radiators are made in artistic styles f both plain and ornamental design, which re readily adapted to interior decorative chemes.

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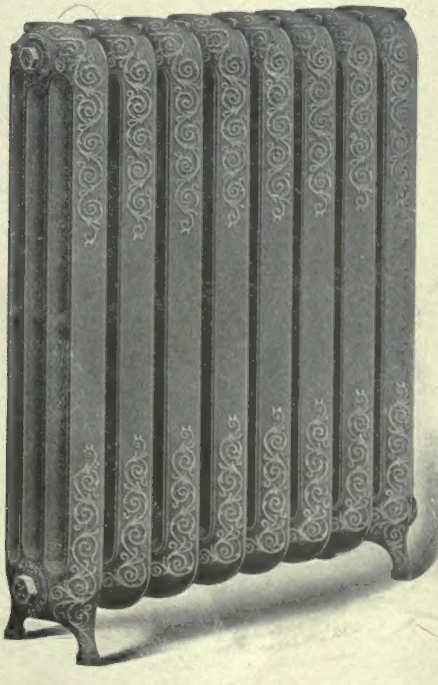

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Roman Stone has established itself as a standard product in Canada in the last decade.

The leading architects have specified it wherever stone can be used.

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Also for

Stone Trimmings in all classes of moderate and high priced residences.

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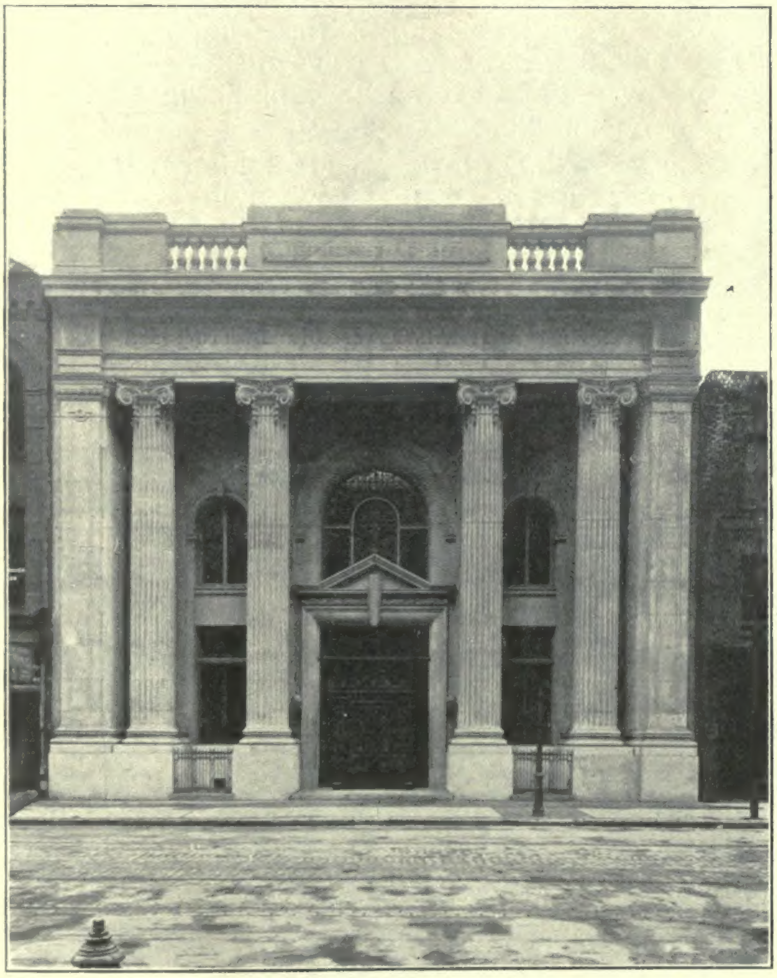
It is made from the best and purest materials.

It requires no waterproofing.

It is uniform in quality and composition—no facing material being used.

It is made by the oldest established firm in the largest and best equipped plant in the Dominion.



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Builders who require the best always order **ROMAN STONE**

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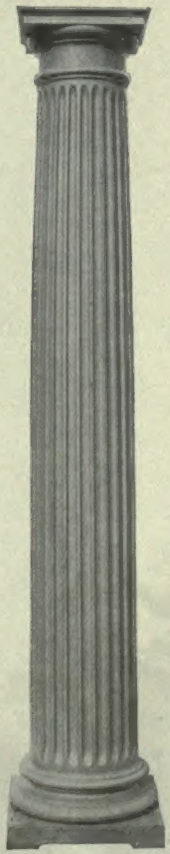

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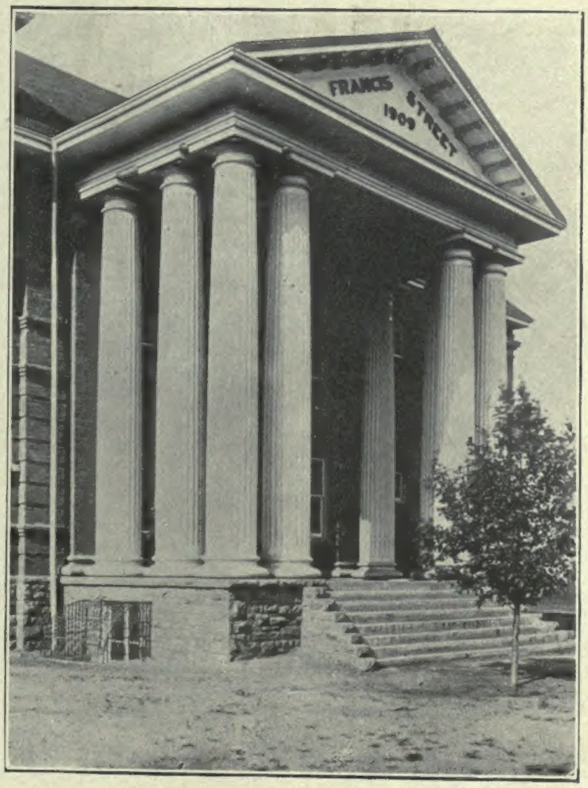

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The above Fluted Columns, which are 36 inches in diameter at base of shaft and 26 feet long were manufactured by us.

Our column department, which contains 10,000 square feet of floor space, is equipped throughout with special machinery mostly of our own design. We have appliances to make plain or fluted columns up to 48 inches in diameter and 40 feet long.

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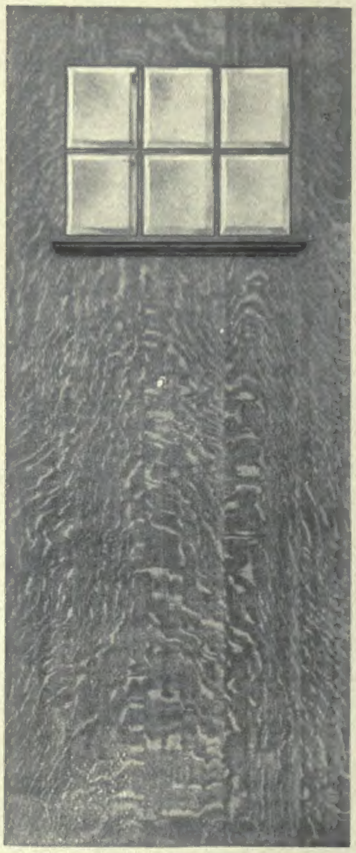

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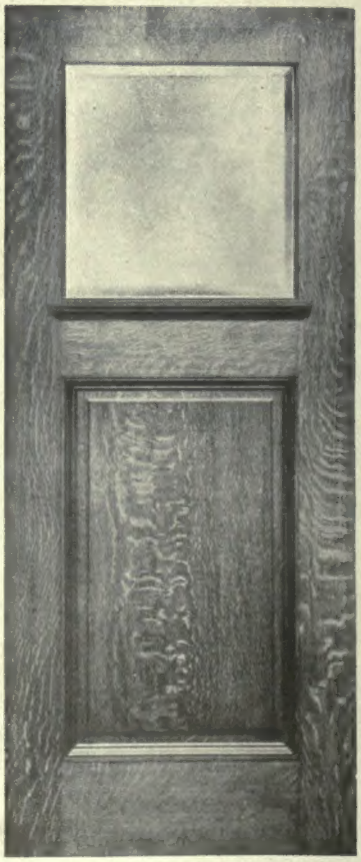

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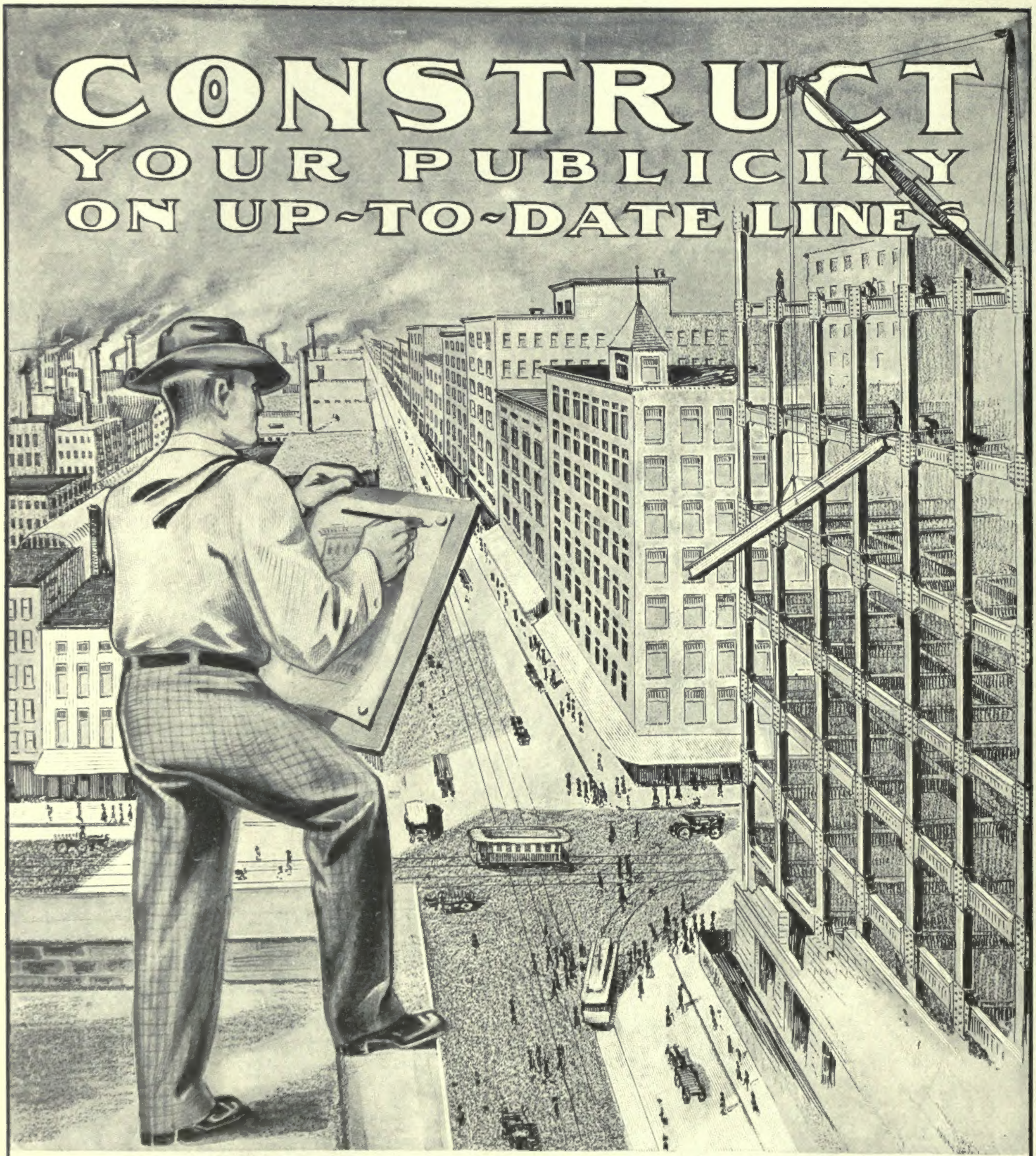

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The Builder and Contractor

A National Building Paper for Canada

¶ This issue is typical of the Journal we purpose to produce. It is not the best we shall give you. When our Organization gets running smoothly we shall do much better. Not that we are offering any apologies for this one.

Mr. Builder

¶ We want to meet your every need professionally. Send us your difficulties. In our Question Page we shall take care of these. Our organization covers the whole of Canada.

C. H. MOODY
British Columbia and Alberta

F. J. TYNER
Eastern Ontario

G. A. TALBOT
Western Ontario

H. KAVANAGH
Quebec

These are only some of the men who are gathering news and ideas for us in the various parts of the Dominion. They devote all their time to our publications. They can be depended on to make the journal worth while by making it a medium for the interchange of ideas.

J. E. CHURCH
Manitoba and Saskatchewan

No Builder can Afford to be Without This Journal

¶ Read this issue carefully, especially the editorials. Any department will save you the cost of a subscription many times over. Do not miss a single issue. Tear out this slip and send it today.

1911

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THE BUILDER AND CONTRACTOR

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A Journal Devoted to the Interests of the
BUILDERS OF HOMES
PUBLISHED ON 1st AND 15th OF EACH MONTH
For Contents See Page 35

C. S. ACTON - - PRESIDENT
K. A. MACKENZIE, B.A.Sc., MAN. EDITOR
A. E. UREN - - ASSOC. EDITOR

By Way of Introduction

The mere entrance of a new journal into the field is no indication that there is a demand for such publication. The fact remains, however, that the builders of houses are a large and important body in the community, that they are busy men; that they are constantly meeting with new and varied problems, which they have not the time to independently investigate, and that at the present time they have no publication devoted exclusively to their problems and interests.

The Builder and Contractor purposes covering one field only, that of the house builder and home maker, a field wide enough to engage undivided attention of any periodical.

Mr. Builder, you as a business man have not the time to sit down and work out problems for the betterment of your profession, so the editor and his staff, all trained observers and writers, will study them out for you and present them in the form of editorials and special articles. You will be offered in every issue practical articles showing how the problems of the trades are handled in various parts of the Dominion, and seldom will there be an edition that does not contain at least one article which will be of more value to you than the price of the subscription.

All departments of the building will be treated, excavation, masonry, carpentry, heating, ventilating, plumbing, decorating, etc. These, however, will be discussed, not from the standpoint of the separate trades, but from that of the owner and builder.

There are certain facts and principles of all trades which the building contractor should know, the details, however being quite properly left to the particular trades.

Not only shall we discuss the artistic and practical lay out of houses, both on plan and elevation, but it is our intention to pay considerable attention to the placing of houses, on their lots, not only in relation to their special design but to the other houses in the vicinity. This in its most ample sense will include Town Planning. Town Planning is both a science and an art. Unfortunately in Canada we have so far regarded it as neither, leaving the matter entirely to chance. In this respect we lag woefully behind other countries. We are going blindly on, making the same mistakes they did in their development, not profiting by their example. With a very few exceptions—Prince Rupert being a noticeable one—Canadians have not taken full advantage of their opportunities in planning the towns either for beauty or utility. An account of what has been done in Europe and what is being attempted in America cannot fail but be interesting and instructive to our readers. For, until such a time as we have enacted proper laws respecting town planning, the beauty of our growing town and suburbs is largely in their hands.

Of course, we have our business side, you will note that we give special attention to the "Markets". Our treatment of these will give the reader the national scope of our journal. While Toronto is our place of publication, we want the builders of Sydney and Victoria to feel that we are as much interested in them as in their fellows in Ontario. With this issue our circulation staff simultaneously start to work in all the different provinces. Our aim shall always be, to be truly Canadian, not local.

This is an age of progress. In no field of industry are improvements being made more rapidly than in the building trades, improvements that make both for utility and economy. In our "Manufacturer's Section" we shall attempt to keep in touch with these. Have you ever considered that the advertising section of trade and technical papers is one of its most valuable? Some people even throw a paper down without scanning the advertisements, although as much brains are expended there as in the editorial work. Advertisements in a paper are a complete business directory of manufacturers, jobbing houses and specialties pertaining to the crafts. They show without loss of time where to send for a needed article. The advertisements show the builder what is new on the market thereby keeping him abreast of the times, and the man who lags behind is always too late to reap the full benefit of his endeavors.

The House and the Imagination

In their efforts to give their readers "practical" articles on house building, some of the more popular magazines and newspapers have, for some time past, been publishing plans and costs both estimated from unexecuted designs and from executed work. Many of these articles have proved excellent business for their respective publications, leaving little to be desired, for the credulous reader unfamiliar with the vital facts of the problems. The value of such articles is, of course, in proportion to their influence to stimulate imagination. Here we have the very complex operations of design and building construction made so easy and inexpensive that it really makes one feel sinful to have postponed so long building that charming house in the country or suburbs. These writers have so dramatized the situation, producing of course always a happy ending that their readers have been persuaded into the habit of taking for granted certain statements and excepting certain conventions producing an illusion and a delusion.

The impression is an illusion because these articles with their photographs, illustrations, plans and other drawings are not as they appear to be. They are pictures for the imagination, not faithful means of conveying the vital facts in a way entirely comprehensible to those for whom they are intended. The impression is a delusion because the houses depicted purport to be more and better than they are, the illustration being so contrived as to exaggerate the advantages to which it is intended to take favorable notice, disguising anything which does not aid in producing the desired impression.

The design which is shown by plans, elevations, and the perspective, is described in an article of some length, though hardly of sufficient length to bring out those matters of building construction on which it is most important for the prospective owner to have expert advice and supervision. Who is to exercise this supervision over the design it does not appear, and the nature of the design does not suggest that any would be necessary. The goods are shown, the prices estimated. The decision rests with the would-be owner. If he be unacquainted with building matters and impressionable, the building will suit him to a tee, provided of course the pictures and drawings appeal to him as attractive. He will sign a contract feeling entirely satisfied with his transaction until he sees how his imaginary house looks when translated into stone and wood. Then he begins to reflect, bethinks him of specifications. Alas! there are none. He realizes that his guarantee does not and cannot protect him. He is at the mercy of the builder whose restrictions it is found are few and entirely convenient for his peace of mind. The owner accepts the inevitable, capitulates, and reviles builders and building in general, not for a moment taking any portion of the blame on his own shoulders, where it really belongs, because he accepted the descriptions of a picturesque writer rather than the specifications of a practical man.

A Possible Timber Famine

It is about two years since Mr. Gifford Pinchot, then Chief Forester of the United States, having made, under the instructions of the Federal Government, an inquiry into the timber resources of the States, reported that at the present rate of consumption the timber limits of the United States would be all gone in twenty-three years. This estimate is alarming, not only on account of the source from which it springs, but also because it is admittedly based on the assumption that the present rate of timber consumption in America will remain at to-day's figure. Statistics show that, notwithstanding the great increase in the use of concrete, iron, and steel throughout the United States, the use of timber per head of the population was almost doubled in the past twenty years. The stumpage, or standing timber, of the United States is currently estimated at 1,400,000,000,000 ft. This was the figure accepted by Mr. Gifford Pinchot when he made his famous estimate of the complete exhaustion of the forest reserves of the United States in twenty-three years from 1908. But some authorities have put the standing timber as high as 2,000,000,000,000 ft., and, accepting that figure, the evil day might be postponed for thirty-three years. In a portion of the Southern States of the American Union a relatively small belt of valuable timber is left, chiefly cypress, cedar, and long-leaf yellow pine, but it is estimated by the best authorities that within seven years this belt will have been cut clean. In Eastern Canada deforestation has proceeded at the same rapid rate as in the Eastern States of America. The virgin forests have been cut away, with the exception of isolated belts which are held by strong hands. Eighteen years ago standing timber in Ontario was practically worth nothing. A settler clearing his land for crops would then have been glad to get $2.50 per 1,000 ft. for the cut timber, which would just about have paid for clearing the ground and hauling the timber to market. To-day such timber would fetch at least $14.00 per 1,000 ft.

The Stride of a Giant

During the past year the people of Toronto alone erected 8,499 buildings valued at over twenty-one million dollars. The great majority were dwelling-houses, but among the others were sky-scrapers, banks, warehouses, schools, hospitals, and all the varied structures that a great city calls into existence. A single bank building contributes three-quarters of a million to the total, and will architecturally be one of the most notable buildings in Toronto. The houses built would supply home for almost thirty thousand people, and the comforts and luxuries provided in most of them as far surpass those of the modest homes of a quarter century ago as they in their turn surpassed the rudely fashioned dwellings of the early settlers.

The wonderful growth of Canada represented by Toronto's building returns is scarcely greater than that indicated by the statistics of Vancouver, Winnipeg, and Montreal. It is quite evident that the Canadian of twenty-five years hence will be able to name four cities in the Dominion with a population of over half a million each and possibly two with a million. What is producing the great wealth poured into city building in Canada? Has the National Policy at last begun to make us rich? There can be but one answer to that question. Were protection the cause of Canada's prosperity, how comes it that the United States, which has far more protection than the Dominion, is curtailing production and shortening sail and talking depression at a time when Canada is prospering to a degree never before experienced? It is the free land of the Dominion that makes the difference, the vast unexploited riches of the public domain. The tide of immigration pouring into the country is bringing us men and women from many lands, who have never had free access to the opportunities afforded by nature for the production of wealth. They have in their former homes tilled soil and felled trees and toiled in mines that belonged to others. Now tens of thousands of them become for the first time their own masters, and the sense of self-ownership makes their labor efficient to a degree that would have been impossible under former conditions. It is the free land of Canada that is enabling the Dominion to go forward with the stride of a giant. There are still sixteen million acres of virgin soil of splendid agricultural value in Northern Ontario waiting for settlers. Toward making Toronto a great city and a prosperous city and a city of homes the settlement of that land will do more than all the tariff laws that could be put upon the statute books.

Western Growth

The twelve western prairie cities spent $33,617,132 on new buildings in 1910. While the operations in Saskatchewan and Alberta were very large Winnipeg's total nearly equals that of all the other cities. These figures in the following table are a remarkable index of the growth of Western Canada.

	1908.	1909.	1910.	Year %.
Brandon	$ 328,375	$ 350,120	$ 940,385	+168.5
Calgary	837,100	2,420,450	*5,500,000	+127.2
Edmonton	2,549,847	2,155,016	2,031,619	— 5.7
Fernie	250,000	1,374,700	325,000	—323.0
Lethbridge	350,000	1,268,215	1,235,045	— 2.5
Medicine Hat...	153,172	249,000	487,293	+ 95.7
Moose Jaw.....	430,925	497,440	1,035,290	+108.1
Portage la Prairie..	250,000	375,000	362,500	— 3.3
Prince Albert...	200,000	144,000	700,000	+386.1
Regina	516,656	800,000	*2,500,000	+212.5
Saskatoon	115,625	942,905	*3,000,000	+218.1
Winnipeg	5,513,700	9,223,650	15,500,000	+ 67.9
Totals	$11,495,400	$19,800,496	$33,617,132	+ 60.6

—*These figures are estimates made by municipal, police and other public officials.

Notes.—J. A. McDougall, of Edmonton, estimates that the amount of building in that city exceeds in cost that of last year's by $500,000, because of work done on permits taken out in 1909.

The figures for Lethbridge are taken from Mayor Adams' report, and are from November, 1909, to Oct. 30, 1910.

Brandon figures do not include $60,000 spent on heating system by Brandon Gas and Power Company.

The decrease at Fernie is due to the fact that 1909 followed the big fire, and the rebuilding of the city began that year.

The Medicine Hat figures include municipal improvements to a very limited extent.—*Manitoba Free Press.*

Clay Products in Canada

Structural materials and clay products are the subject of a bulletin of the Department of Mines, giving the production in Canada for the calendar year 1909. The division is one of the most important in the mineral industry, and as a measure of the progress of the country is perhaps the best of all. Clay products, including cement and brick of various sorts, with lime, slate, building stone, etc., are in demand in proportion to the activity in the building trade, and sustained activity in the building trade means that other lines of commercial activity are or have been profitable. The figures of the bulletin show the value of the products in question to have increased from $11,530,000 in 1906 to $16,533,000 in 1909, the division in the latter year being as follows: —

Cement	$5,345,000
Clay products	6,450,000
Lime	1,132,000
Sand-lime brick	201,000
Sand and gravel	256,000
Slate	19,000
Stone	3,127,000

The most notable growth has been in the case of cement. This material is replacing wood and stone for many uses. It enters into the construction of bridges, large buildings, foundations, and roadways. Fence posts are made of it, and in one of the Jewish cemeteries of Montreal an artist has applied it in the construction of fence panels with an effect not many could have expected. Though it has been made in Canada for many years, it was only in 1902 that the value of the production passed the million dollar mark. By 1909, as the figures given above show, there had been an increase of almost 400 per cent. to the figure given above, which represented the value of 4,067,700 barrels. In the year lately closed this figure was probably exceeded by a goodly amount, the large public and other works under way having increased the demand, and the price having been moderate. In 1909 it was noted that the importations fell to 142,000 barrels; they were 918,000 barrels in 1905. In clay products brick takes first place. Brick-making now is not the simple process it once was. The common burned brick is still the main factor in the industry; but with it there is the pressed brick the ornamental brick and the varied forms of terra cotta, from the simple ornament for the brick house to the highly ornate and glazed material out of which some of the most imposing and modern business buildings are being constructed. This latter, however, is not yet produced in Canada to any extent. The common brick is credited with $4,212,000 of the total value of the clay product output, pressed brick being down for $630,000, and the other varieties named for some $300,000. Pottery, sewer pipe and tiles make up together about $1,300,000. In this department also there is a general increase shown, that also was augmented during the past year, and should be during the present year.

An Inexpensive Detached House to Suit Canadian Conditions

A Substantially Built, Modern and Artistically Planned Home at a Cost of $5650.00

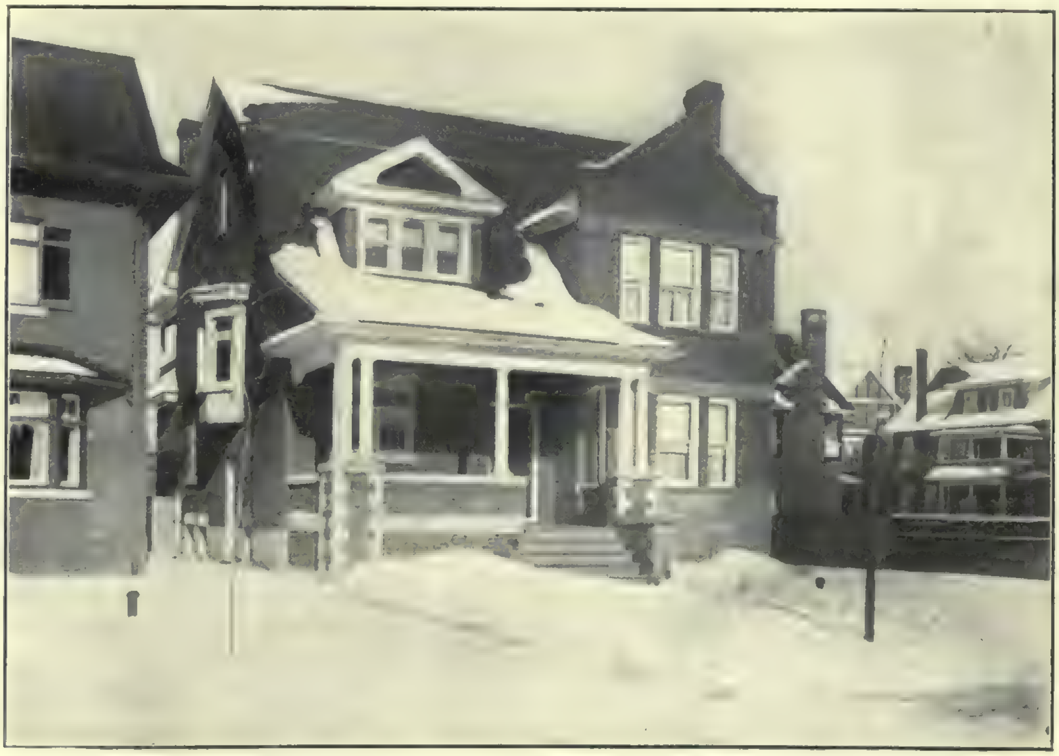
J. H. SELF, Architect

Our growing cosmopolitan population has brought with it influences that are commencing to show their effect upon the designing and building of our homes. The best ideas of other countries are being adopted and are being developed and added to, to suit our conditions, such as climate, customs and materials at hand.

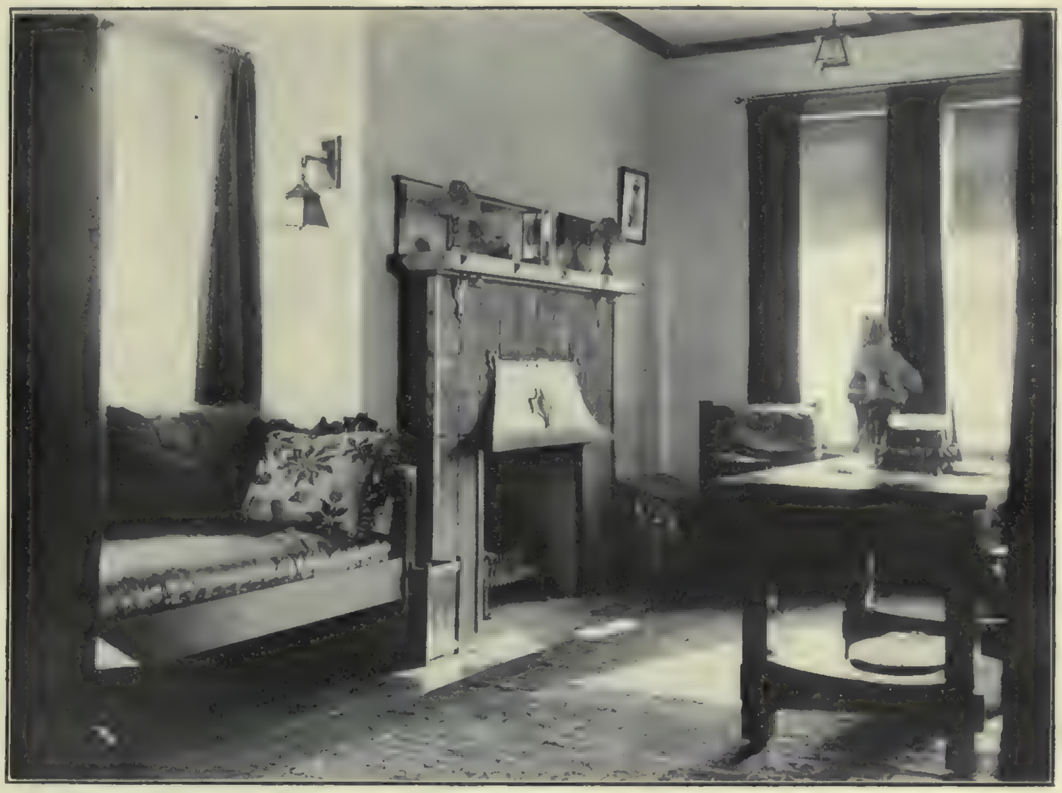
This cosmopolitan influence has tended to give birth to many new effects that are worked out in the Canadian modern dwelling. In early days are residences were less attractive than they are to-day, but in recent years the public are not so engrossed in the sheer matter of providing themselves with a home that they have no time to study the plan and design. This tendency toward art in home building has served to make builders erect a better class of buildings in order to dispose of them. Home builders, or rather, buyers, to-day demand well-planned, substantially-built yet inexpensive houses. Houses need not be expensive to be beautiful. Good taste, proportion, and a good selection of materials and color are only necessary. Early Colonial homes homes were beautiful, yet they were built of inexpensive material. Their simplicity and good taste were the open secrets of their beauty.

For low-priced, moderate-sized dwellings it is doubtful if any particular style in domestic work offers greater possibilities than the one illustrated in this issue. This house was designed by a competent architect with an established position in the profession. The house is situated on Wells' Hill, Toronto, a little west of Avenue Road, and is well adapted to the surroundings. Although the exterior is simple, in general effect it is pleasing for a house of this size. The exterior color scheme is well suited to the environment; the brick is of the dark red common variety, with large grey mortar joints; the trimmings are of grey Indiana limestone, while the roofs are covered with green stained shingle. The gables at sides and portion of rear above the ground floor, as seen in the cut, were originally to have been brown stained shingle, but were changed to brick at an additional cost of about $300.

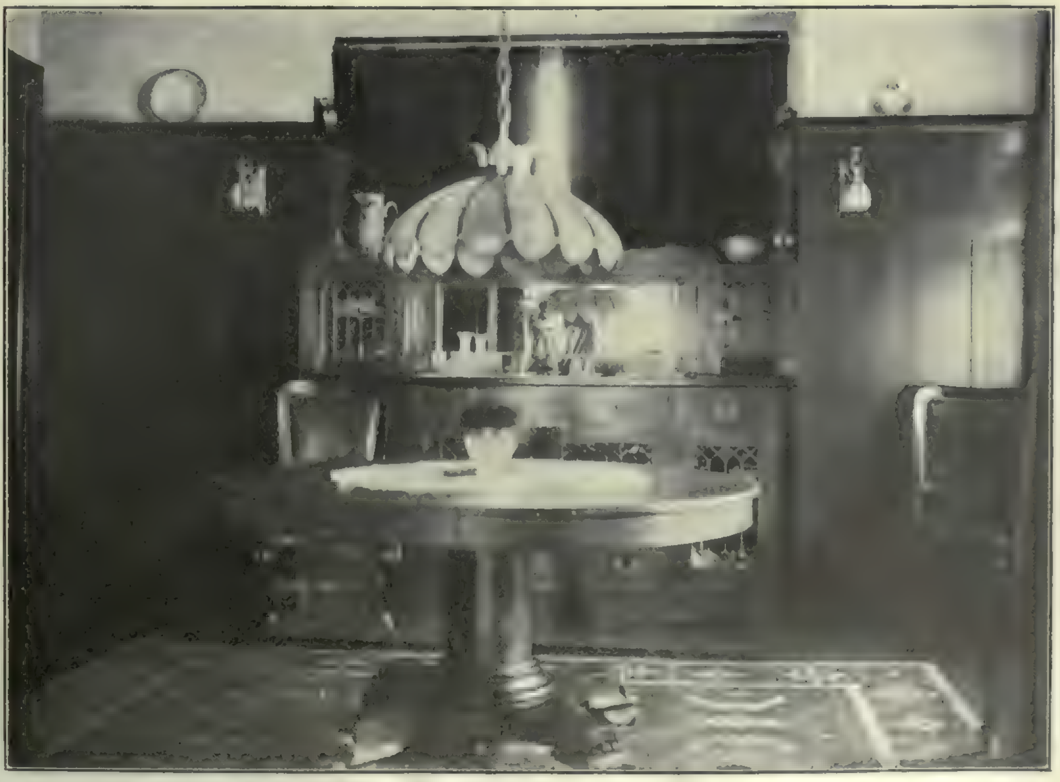
The general layout of the house was planned with a view to comfort and convenience. The ground floor contains spacious halls, den, a beautiful large living room, with sunlight during the entire day, as the room is situated to the south-east; dining-room, pantry, kitchen, porch and large front and rear verandahs.



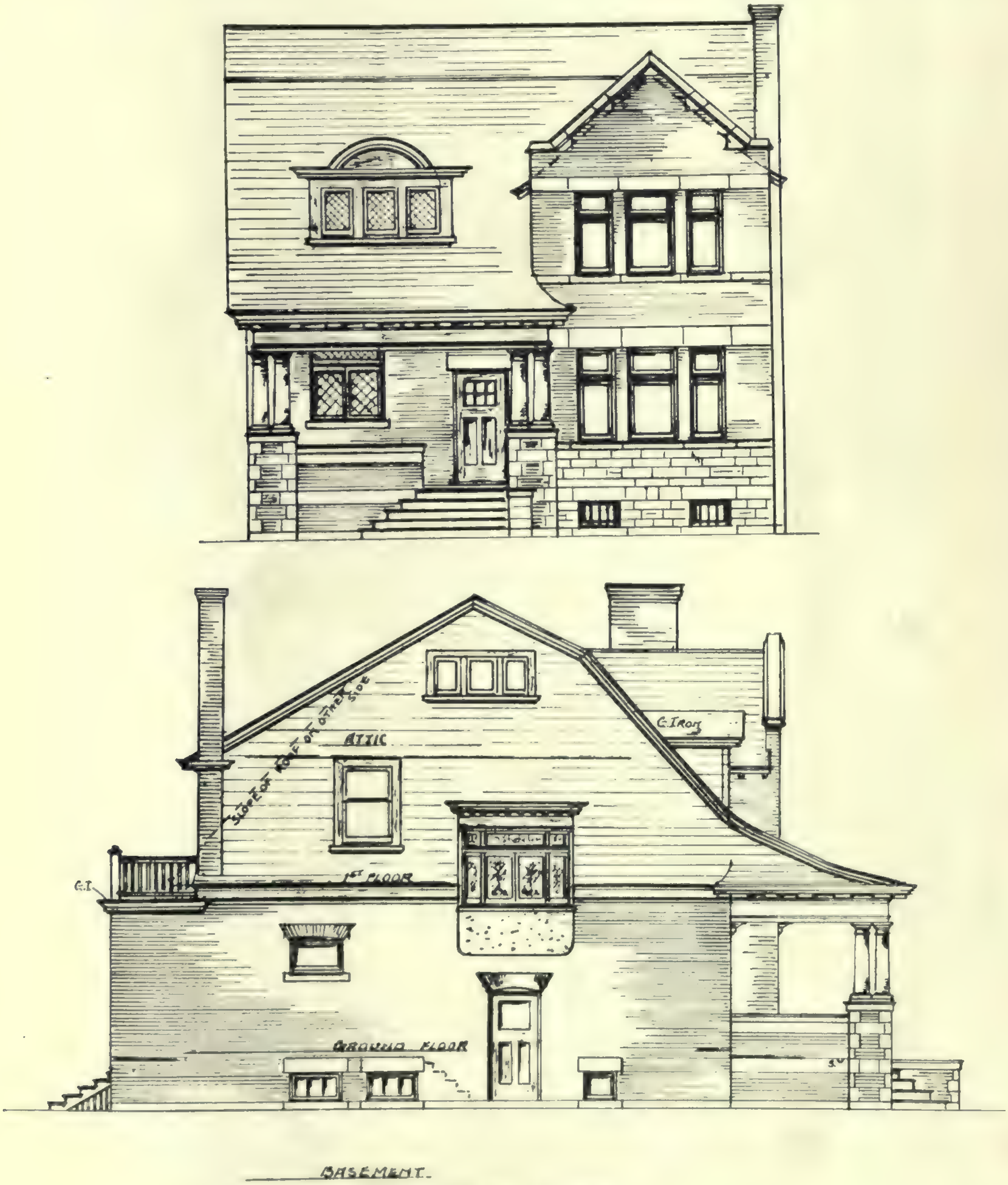
The front entrance opens into a vestibule, whose walls are panelled and ceiling vaulted. The lower hall to stair landing is panelled in black ash to a height of 4 feet. To the right of the hall are the living-room and the dining-room. The woodwork and the mission furniture in the living room are of ash, finished in early English tone. A large fireplace, wide opening with Doric columns, beamed ceiling, and other features lend an air of comfort to this large well appointed room. The dining-room, which has large casement windows with eastern exposure, is finished in black ash; a simple panelling extends about 5 feet above the base, and



Corner of Living Room J. H. Self, Architect



View of Dining Room—Showing a Very Artistic Arrangement J. H. Self, Architect a delicate cornice and centre of plaster give the desired touch to the ceiling. The woodwork is finished in light mahogany, and the walls and ceiling in delicate tints of grey and yellow. The china cabinet, with casements over it, is a unique feature of the room. A cozy little room named a den is placed to the left of the hall. It is finished in black ash, with red burlap panels 5 feet high. The woodwork is stained a bog green. All plaster work in the room is trowelled sand finished and is tinted in yellow brown tints. The arrangement of the kitchen service is ideal. The pantry and kitchen are so located as to provide the maximum degree of convenience, with the least possible labor. The floor throughout on this floor, with the exception of the kitchen is quarter-cut oak laid on spruce.

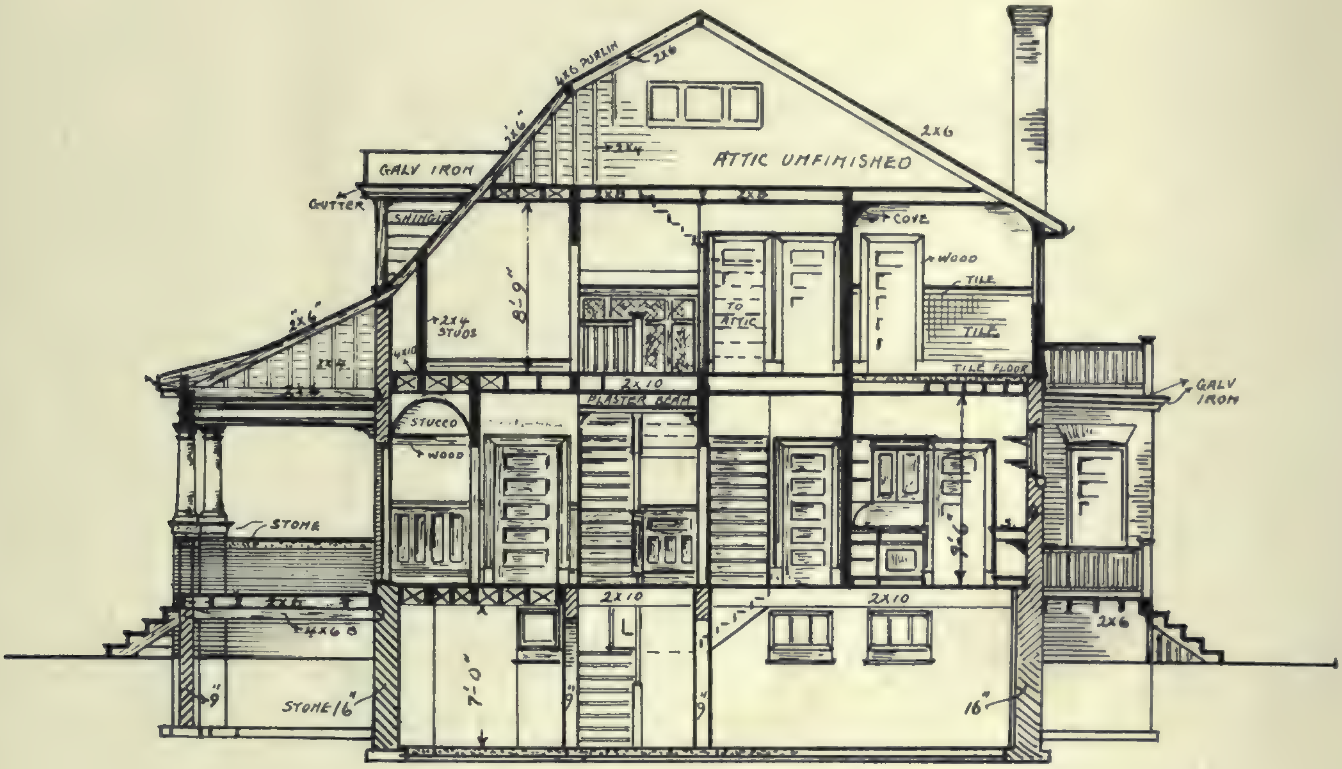


Front and Side Elevations

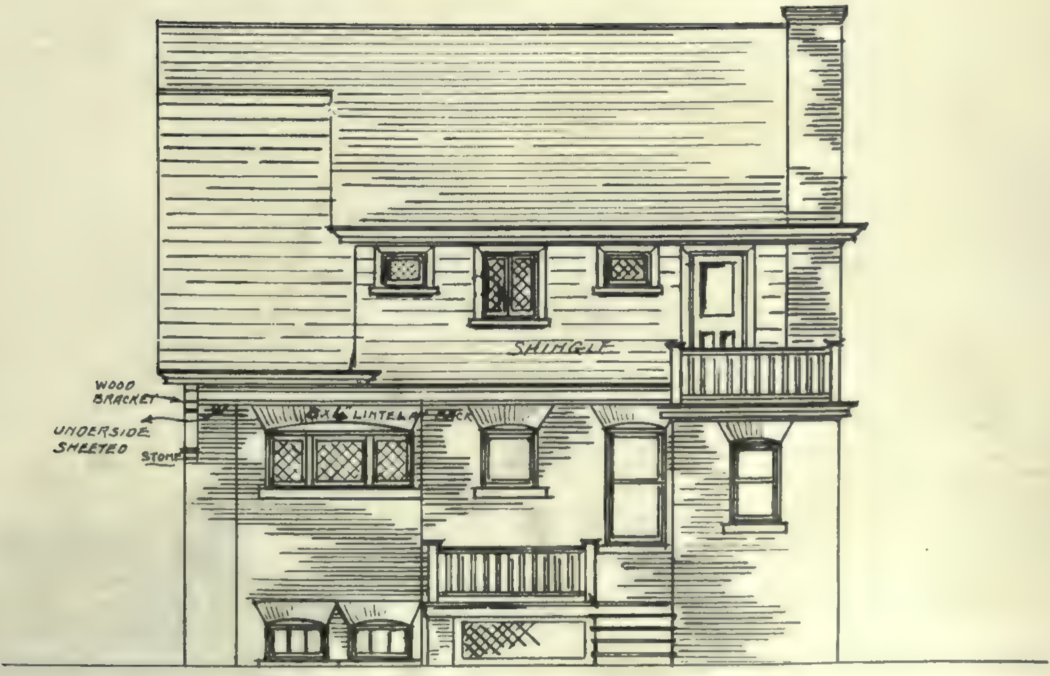
The stairway leads to a large hall finished in Georgia pine and stained as lower hall. All the rooms on this floor are finished in clear white pine with white pine floors. Bedroom No. 1 is white enamelled, but all other rooms are painted in light colors. All the rooms have large closets, an item which is often neglected in a house of this size.

A large, well-fitted, well-appointed, tiled bathroom and separate water closet are also splendid features of the plan.

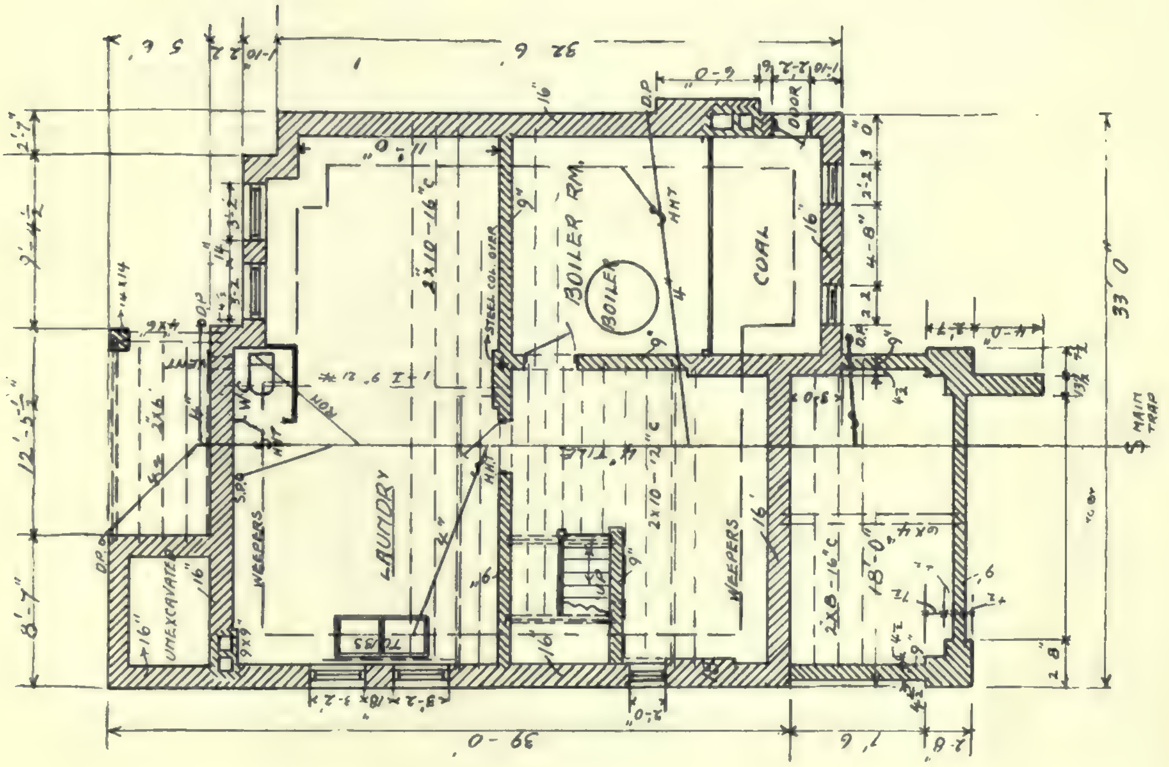
Two large servants' rooms can be built in the attic if desired, at an additional sum of a little over $200.



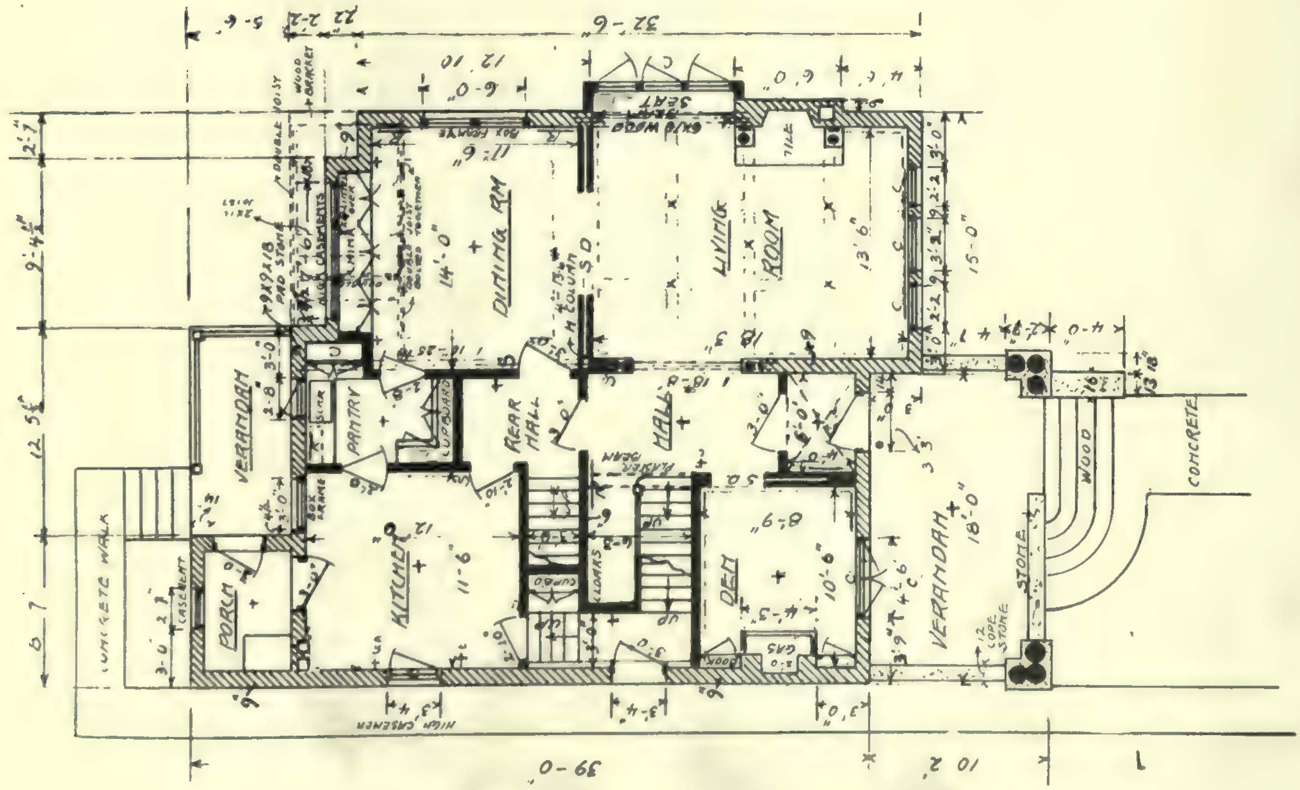
Longitudinal Section of House



Rear Elevation of House



BASEMENT PLAN



Quantity Survey and Estimated Cost of House

As Described in Previous Article

EXCAVATION AND MASONRY—

Staking out, etc	$ 25 00
258 yards excavating at 40c	103 20
Refilling, etc.	10 00
Grading and Sodding	20 00
Concrete floors, 120 yds. at 55c	66 00
Concrete walks	45 25
68 cubic yds. of stone walls at $3.50	238 00
Plastering walls	30 00
54m bricks at $20	1,080 00
86 lineal feet of flues at $1.00	86 00
Brick piers, etc.	10 00
Water supply	10 80
Attendance on other trades	10 00
Setting of stonework	22 00
Total excavating, masonry and concreting	$1,756 25

DRAINS—

Street connection	$ 45 00
41 yds. house drains, 4-in. tile, with excavation, at $1.85 yd.	75 85
116 ft. weeping tile at 8c ft.	9 28
Elbows, traps, gratings, etc.	10 20
	$ 140 33

CUT STONE WORK—

50 ft. 4-course tooled stone coursing at 50c	$ 25 00
30 ft. stone quoins at 45c	13 50
32 ft. 4-course tooled stone heads at 60c	19 20
40 ft. molded coping, including apex and seating stones at 90c	36 00
81 sq. ft. of rock-faced ashlar at $8 per sq. yd.	24 00
22 ft. of rock-faced sills at 40c	8 80
91 ft. of tooled sills at 50c	45 50
6 pad stones at $1.00	6 00
Protection of stone work	7 00
Total cut stone work	$ 185 00

IRON WORK—

1 1-8-lb. beam, 11 ft. long; 1 25-lb. beam, 17 ft. long; 2—25-lb. beams, 10 ft. long; 1,123 lbs. at 3½c	$ 39 30
1 column, with connections	11 00
Anchors, straps, bolts, etc.	12 50
Erection and contingencies	8 00
	$ 70 80

CARPENTER AND JOINER—

FRAMING LUMBER—

No.		Board Measure
1—6-in x 9-in. x 11-ft.	head	50
1—4-in. x 6-in. 10-ft.	beam	10
1—6-in. x 10-in. x 10-ft.	beam.	50
1—14-in x 14-in. x 13-ft.	beam	91
8—2-in. x 10-in. x 17.-ft. 6-in.	floor joists, first floor	234
6—2-in. x 10-in. x 10-ft.	floor joists, first floor	100
24—2-in x 10-in. x 16-ft	floor joists, first floor	640
2—2-in.x x10-in x 3-ft.	floor joists, first floor	10
1—2-in.x x10-in. x 10-ft	floor joists, first floor	17
15—2-in x 10-in. x 14-ft.	floor joists, first floor	350
9—2-in.x x8-in. x 18-ft.	floor joists, first floor	216
48—2-in. x 8-in. x 12-ft.	floor joists, second floor	800
5—2-in. x 6-in x 12-ft.	floor joists, first floor	60
10—2-in. x 10-in. x 18-ft.	floor joists, first floor	300
18—2-in. x 10-in. x 11-ft.	floor joists, first floor	330
26—2-in. x 10-in. x 15-ft	floor joists, first floor	650
13—2-in. x 10-in. x 19-ft.	floor joists, first floor	417
5—2-in. x 10-in. x 6-ft.	floor joists, first floor	50
6—2-in. x 6-in. x 11-ft.	ceiling joists	66
6—2-in. x 4-in. x 11-ft.	ceiling joists	44
4—1-in. x 10-in. x 17-ft.	extra for trimming joists	57
4—1-in. x 10-in. x 12-ft.	sills, heads, etc	46
12—2-in x 4-in x 18-ft.	sills, heads, etc.	144
Carried forward		4,732
Brought forward		4,732
12—2-in. x 4-in. x 14-ft.	sills, heads, etc.	112
36—2-in x 4-in x 3-ft.	sills, heads, etc.	72
6—2-in x 4-in. x 12-ft.	sills, heads, etc.	48
12—2-in. x 4-in. x 12 ft.	sills, heads, etc.	88
11—2-in. x -in. x 14-ft.	sills, heads, etc.	112
6—2-in. x 4-in. x 5-ft.	sills, heads, etc.	20
145—2-in. x 4-in. x 11-ft.	studs	1,064
6—2-in x 4-n. x 18-ft.	sills, heads, etc.	72
24—2-in x 4-in. x 3-ft.	sills, heads, etc.	48
6—2-in. x 4-in x 11-ft.	sills, heads, etc.	44
6—2-in. x 4-in. x 6-ft.	sills, heads, etc.	24
6—2-in. x 4-in x 5-ft.	sills, heads, etc.	20
6—2-in. x 4-in. x 9-ft.	sills, heads, etc.	36
6—2-in. x 4-in. x 16-ft.	sills, heads, etc.	64
12—2-in x 4-in. x 21-ft.	sills, heads, etc.	168
6—2-in. x 4-in. x 18-ft.	sills, heads, etc.	72
6—2-in x 4-in x 8-ft.	sills, heads, etc.	32
12—2-in x 4-in x 5-ft.	sills, heads, etc.	40
12—2-in. x 4-in. x 15-ft.	sills, heads, etc.	120
12—2-in. x 4-in, x 15-ft.	sills, heads, etc.	120
6—2-in x 4-in x 3-ft.	sills, heads, etc.	12
30—2-in x 4-in x 10-ft.	sills, heads, etc.	200
6—2-in x 4-in. x 4-ft.	sills, heads, etc.	16
167—2-in x 4-in. x 10-ft.	studs	1,114
123—2-in. x 4-in. x 8-ft.	(average)	656
16—2-in x 6-in. x 8-ft	rafters	128
16—2-in x 6-in x 12-ft.	rafters	192
16—2-in x 6-in. x 14-ft.	rafters	224
16—2-in. x 6-in. x 22-ft.	rafters	32
4—4-in. x 6-in. x 17-ft.	purlins	136
2—2-in x 8-in. x 17-ft.	ridge pieces	46
4—2-in. x 8-in. x 19-ft.	plates	104
4—2-in x 8-in. x 15-ft.	valley rafters	80
2—2-in. x 8-in. x 5-ft.	valley rafters	14
6—2-in. x 4-in x 5-ft.	studs, forming dormer	20
2—2-in x 4-in x 8-ft.	studs, forming dormer	11
2—3-in x 4-in x 10-ft.	sills and heads	20
6—2-in x 4-in x 6-ft.	studs to living room bay	24
6—2-in x 4-in. x 12-ft.	studs to living room bay	48
6—2-in. x 4-in x 10-ft.	studs to oriel bay	40
		10,495
10 per cent. for waste		1,049
Total framing lumber, ft.		11,544

11,544 ft. at $20 per m	$ 230 88
1,800 ft. 1-in. hemlock at 22	39 60
20,000 shingle at $2.50 per m	50 00
Asbestos and stain for same	10 00
Wall strapping	16 00
164 ft. facia board; 90 ft. soffitts; 254 ft. at $35 per m	8 90
200 ft. 3-in. bed mould at 5c	10 00
42 ft. verandah cornice, etc., at 30c	12 60
50 ft. crown mould at 8c	4 00
230 lineal ft. of 2-in. x 2-in. hemlock for bridging	2 60
200 ft. half-inch hemlock at $18	3 60
750 ft. 1-in. spruce at $22. per m.	16 50
750 ft. quarter-cut oak at $60 per m	45 00
2,500 ft. ⅞-in. pine flooring at $35 per m	87 50
Material for front and rear steps	18 00
24 casement frames and sashes at $4.00	96 00
5 box frames at $4.25	21 25
1 hall oriel frame, etc.	9 00
1 living room bay with sash	13 25
5 door frames with oak sill at $4.00	20 00
90 ft. of black ash and oak for jambs at $90	8 10
150 ft. of white pine for jambs at $35	5 25
130 ft. oak for treads and risers at $90 per m	9 70
80 ft. bed mould at 2c	1 60
24 ft. oak hand rail at 30c	7 20
Three 6-in oak newels at $3.30	9 90
160 ft. pine for treads and risers at $35	6 30
2 5-ft. pine newels at $2.90	5 80
18 lineal ft. pine handrail at 20c	3 60
48 lineal ft. 1¾-in. oak strings	6 00
76 ft. 1¾-in. pine strings	4 25
68 oak balusters at 10c	6 80
Carried forward	$ 789.18

These costs are based on average Toronto conditions, they will vary in different parts of Canada and are only given as a basis for comparison. A complete set of working Blue Prints and Detailed Bill of Materials may be obtained from Dept. K. The Builder and Contractor.

Brought forward	$ 798 18
62 plain pine balusters at 5c	3 10
350 ft. black ash for panelling at $60 per m	21 00
205 ft. black ash for ceiling beams at $60 per m	15 90
310 ft 7/8 black ash cove at 3/4c	2 32
88 ft. black ash plate shelf and mould at 4c	3 52
10 pieces of ½-in x 3-in. x 5-ft. black ash	1 50
190 ft. 8-in. pine base at 3½c	6 65
112 ft. 10-in. long Georgia pine base at 5c	5 60
108 ft. 10-in. black ash base at 7½c	8 10
234 lineal ft. or 167 board ft. black ash casing at $50	8 35
120 board ft. of white pine casing at $35	4 20
76 board ft. of Georgia pine casing at $45	2 66
Crown moulds, base, blocks, etc.	4 40
Window stools, aprons, etc.	6 60
Front door, quarter-cut oak	15 00
Vestibule door, quarter-cut oak	7 00
3 black ash doors at $4.25	12 75
3 black ash sliding doors at $5.00	15 00
4 1¾ white pine doors at $2.25	9 00
8 1⅜ white pine doors, $2.00	16 00
6 1⅜ G. P. doors at $2.50	15 00
2 ⅞-in. sheeted doors at $1.50	3 00
2 pilasters at $2.75	5 50
2 columns at $3.50	7 00
Material for pedestal	2 00
Material for two seats	3 75
Newel posts, rails, etc., for rear verandahs	3 00
Material for pantry fittings	5 75
6 10-in. staved verandah columns at $6.25	37 50
Total cost of material	$1,042 33
Nails, sash weights, etc.	27 50
Hardware	46 20
	$1,116 03
Labor, 45 per cent.; contractor's commission, 10 per cent.; 55 per cent of material of $1,116.03 equals total cost of labor	613 80
Attendance and other items	25 00
Mantels	75 00
Den Book-cases	22 00
China cabinet	40 00
Pugging in bath rooms, etc.	6 50
Total cost of carpentery and joinery	$1,897 83

HOT WATER HEATING—

650 ft. of radiation at 80c.	$ 520 00
GALVANIZED WORK	$ 37 50

ELECTRIC WIRING—

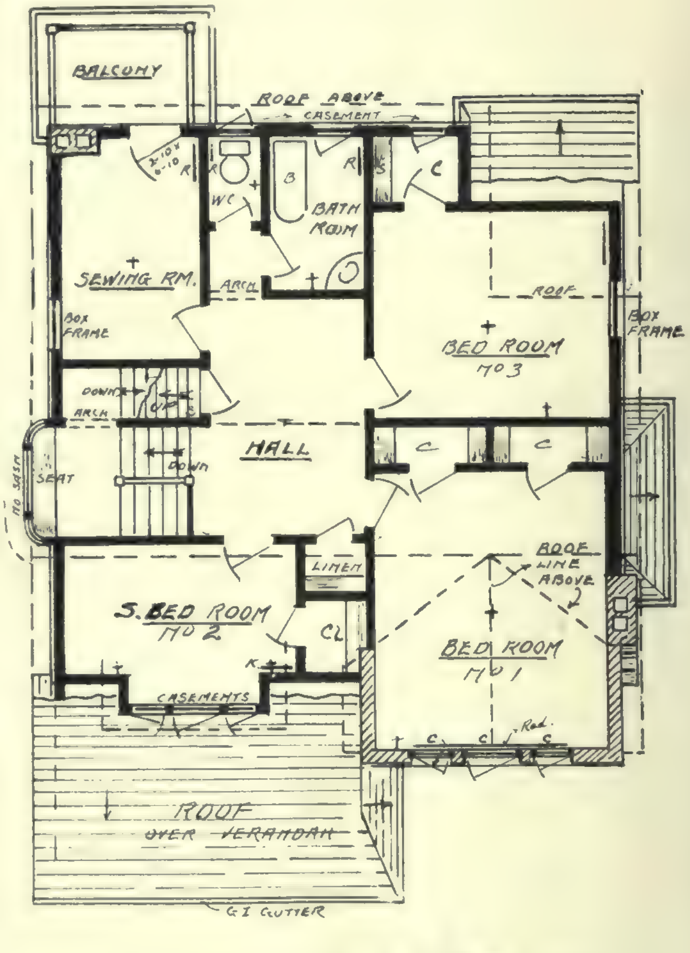
18 switches, 35 outlets	$ 58 00
PLUMBING AND GAS PIPING	$ 390 00
PAINTING AND GLAZING	$ 270 00

PLASTERING—

930 yds. at 30c	$ 279 00
Ornamental work	23 00
Repairing, etc.	12 00
	$ 314 00

RECAPITULATION—

Excavation—Mason, brickwork and cement work	$1,756 25
Drains	140 33
Cut stone	185 00
Ironwork	70 80
Carpenter and joiner	1,897 83
Galvanized iron	37 50
Hot water heating	520 00
Electric wiring	58 00
Plumbing	390 00
Painting and glazing	270 00
Plastering	314 00
	$5,646 71



FIRST FLOOR & ROOF PLAN

J H Self Architect

If finished throughout in oak and birch, with the attic in pine and with a covered verandah, and balcony on rear, this house will cost about $6,600. Or if simplified by using cheaper trim downstairs and shingles in place of brick above ground floor as shown by some of above sketches, it can be built for almost $5,000.

Good and Bad Roof Framing

"It is bad practice," says F. W. Dean of Boston, in a recent paper on mill construction, "to have inclined roof beans project beyond columns which are not in the centre of the building, and trust to their being amply fastened together where they meet at the centre of the roof to prevent movement on each other.

"When there is not a row of columns on the centre, the inclined beams should stop at the columns nearest the centre. A horizontal beam should span the space between these columns and inclination on tops should be produced by two 2-inch planks resting on edge spiked on top of the beams with their sides flush with them and their tops sawed to the proper inclination.

"Sometimes a beam covering the whole thickness of the main beam is used instead of two pieces of plank. This avoids a concealed space over the beam. By using the roof construction just advocated the construction is stable and in accordance with good mechanical principles."

Conscious City and Town Planning

A Plea for a More Systematic and Far-sighted Provision for the Growth of Our Cities and Towns

A chance meeting of a touring party of German architects and town officials on an official inspection of the various town planning or housing experiments being conducted in England at present, turned the writer's attention to this most interesting phase of the social problem.

The last century has been remarkable, not only in America, but in Europe, for the exceptionally rapid growth of towns and cities. This has led to serious congestion in both the old land and the new. In Canada there is no excuse for overcrowding. However, even a casual examination will show that we are going ahead, making the mistakes and unheedful of the experience of European countries.

The density of the cities of the old world has been frequently referred to and reliable data is readily secured. The density of population in America is becoming a study and the increase in density will call for increased attention to health and conveniences.

These American cities, with a population of over three millions, or an average of 338,838 each, have a total area of 195,168 acres, or 21,685 1-3 acres per city, equivalent to 2,788 square feet per capita.

City.	Area Acres	Per Capita Sq. Feet.
Buffalo	26,880	2,918
Cincinnati	27,840	2,526
Detroit	23,040	2,221
Indianapolis	19,840	3,485
Jersey City	12,288	3,091
Kansas City	16,640	2,396
Los Angeles	19,840	2,875
Minneapolis	34,080	4,791
Newark	14,720	2,004
Toronto	17,920	2,399

Toronto, with 2,399, is 389 square feet per capita behind the average of these nine cities of the United States, all of which are thickly populated.

The eighteen cities of Ontario aggregated, cover a total area of 80,341 acres. This is equivalent to 4,813 sq. feet per head of population, including streets, parks and open spaces. The proportion of streets, parks, public buildings, churches, etc., has been variously estimated at from one-quarter to one-third of the total area. The latter figure is doubtless the more accurate, being based on the opinions of about 20 city engineers furnished the writer some time ago. On this basis the eighteen cities have a net area of 53,561 acres.

The position of Toronto, last in the table, is more or less problematical. With 44.76 per cent. of the population of all the cities of Ontario, only 22.3 per cent. of the total area is at her credit, as assessed in 1910. If the area should be doubled the "Queen City" would still be 120 acres short of the average standards, a serious situation, requiring attention. This overcrowding may not be apparent to the individual observer, but nevertheless it is a real, vital fact. Even London, England, has 358 square feet per capita more than Toronto.

For many years social reformers have been protesting against the evils which have arisen, owing to the rapid and disorderly increase in the size of towns and their population.

Miles and miles of ground, which people not yet elderly can remember as open fields, are now covered with a dense mass of buildings, packed together in rows, along streets which have been laid out in a practically haphazard manner without any forethought for the common interests of the people. It is not to any design adopted for the benefit of the whole public that we are indebted to such semblance of order or convenience as may be found here and there in new areas.

To the travelled man who has seen what has been accomplished in other countries it is hardly necessary to urge a proper system of town planning. It seems rather remarkable that nations so optimistic as the American, both of Canada and the United States, are so short sighted regarding the future requirements of their cities and towns. From day to day we read of ambitious plans outlined by Guilds of Civic Art for the beautification of their various cities. These are often visionary, never to be realized on account of their enormous cost. Had a little forethought been exercised a generation, a decade, or even a few years before, in numerous cases these schemes could have been consummated at a mere fraction of the present cost. Our municipalities need men of vision and legislation to provide for the enjoyment and necessities of posterity.

If these Guilds of Civic Art would engage their attention and concentrate their endeavours on possibilities inviting immediate solution while chasing their rainbows, the next generation would rise up and call them "blessed."

The advantage of the land around a growing town or city being laid out on a plan prepared with forethought and care, to provide for the needs of the growing community, seems self-evident; and yet it is only within the last few years that any general demand for such powers of town planning has been made. The corporations and other governing bodies have looked on helplessly while estate after estate around their towns has been covered with buildings without any provision having been made for open spaces, school sites, or any other public needs.

The owners' main interest, too often their only one, has been to produce a maximum increase of value possible for themselves by crowding upon the land as many buildings as it will hold.

The community through its representative bodies having watched the value of land forced up to its utmost limit has been obliged to come in at this stage and purchase at these ruinous values such scraps of land as may have been left in order to satisfy in an indifferent manner important public needs.

In this way huge sums of public money have been wasted.

In 1889 Mr. E. Howard, in England, published a little book entitled "To-morrow," in which all this was very forcibly stated, and in which he suggested that it would be comparatively easy to try the experiment of developing a town on the precisely opposite and obviously rational method, of first taking a plan, and, by the exercising of foresight, providing in that plan for all public needs likely to arise and then securing the developments of the town along the line of this plan.

This scheme was so obviously rational that in a comparatively short time it attracted the attention of a sufficient number of reformers to create a strong Garden City Association, and, as a result of their efforts in popularizing the idea, in the year 1903 an estate was purchased of about 3,800 acres at Letchworth in Hertfordshire, upon which there has now come into being the nucleus of a considerable town.

This movement was too theoretical and experimental to appeal very widely to the English people, but another book was forthcoming of quite a different character.

"The Example of Germany" by Horsfall, first published in 1904, showed how in Germany the same problem of the rapid increase of towns had been dealt with on lines similar to those advocated by Mr. Howard.

Unfortunately the English people do not in very large numbers read books in foreign languages.

Germany for many years, and, indeed, many other countries, have been studying orderly planning and designing of towns as an ordinary part of the routine of municipal government.

International congresses of housing reformers and architects, the exchange of international courtesies between municipal bodies and the work of various associations and individuals have contributed to spread the knowledge that powers for planning and controlling the developments of their cities more or less on the lines of those possessed by Germany are enjoyed and successfully used by municipalities of most countries except America, France and England up to the present time.

This is the kind of evidence which the Englishman likes. On the strength of this, the demand for town-planning powers has become so general and so influentially backed by municipal corporations that the Imperial government has already passed through the House of Commons a Bill conferring on municipalities some of the necessary powers. A summary of this law will be printed in a later article.

Although we are just realizing the importance of the comprehensive and orderly planning of our towns, it must not be supposed that nothing has hitherto been done to cope with the evils raised by their rapid growth. On the contrary, much good work has been done.

In the ample supply of pure water, in the drainage and removal of waste matter, in the paving, lighting, and cleaning of streets, and in many other ways, probably our towns are served as well as, or even better than those elsewhere.

But to return to our German friends. Among the places they visited was the Hampstead Garden Suburb, an ideally situated area on the border of one of London's famous playgrounds, "Hampstead Heath," and at the terminus of the Hampstead Tube. It was my good fortune to meet some of the men behind this project, who were most kind and courteous in their treatment and lavish in their information. So much so that I returned on several occasions alone to thoroughly digest the information. Mr. Raymond Unwin, the chief architect, was most interesting, combining the business man with the artist in a most unique degree.

He has made a town planning a life study. His book "Town Planning in Practice," published by T. Fisher Unwin, may be considered a text on the subject. I shall quote freely from its introduction, leaving a description of Hampstead for a future article.

"Important as are all provisions for man's material needs and sanitary existence, they do not suffice. There is needed the vivifying touch of art which would give completeness and increase their value tenfold; there is needed just that imaginative treatment which would transform the whole."

Professor Lethaby has well said: 'Art is the well doing of what needs doing.' We have in a certain niggardly way done what needs doing, but much that we have done has lacked insight of imagination and generosity of treatment which would have constituted the work well done, and it is from this well doing that beauty springs. It is the lack of beauty, of the amenities of life more than anything else, which obliges us to admit that our work of town building has not been well done."

"Not even the poor can live by bread alone; and, substantial as are the material boons which may be derived from such powers for the control of town development as we hope our municipalities will soon possess, the force which is behind this movement is derived far more from the desire for something beyond these boons, from the hope that through them something of beauty might be restored to town life.

"We shall need to secure still more open ground, air space and sunlight for each dwelling, we shall need to make proper provision for parks and playgrounds, to control our streets, to plan for their direction, their width and their character, so that they may in the best possible way minister to the convenience of the municipality. We shall need power to reserve suitable areas for factories, where they will have every convenience for their work and cause the minimum of nuisance to their neighbors. All these practical advantages and much more may be secured by the exercise of powers for town planning, but above all we need to infuse the spirit of the artist in our work.

"Beauty is an elusive quality, not easy to find, not always easily attained by direct effort, and yet it is a necessary element in all good work, the crowning and completing quality. Civic art is too often understood to consist of filling our streets with marble fountains, dotting our squares with groups of statuary, and twining our lampposts with wriggling acanthus leaves or dolphins' tails and our buildings with meaningless bunches of fruit and flowers tied up with impossible stone ribbons. William Morris said: 'Beauty, which is what is meant by art, using the word in its widest sense, is I contend no mere accident of human life which people can take or leave as they choose, but a positive necessity of life, if we are to live as nature meant us to—that is unless we are content to be less than man.' There is little thought bestowed on the individual building, or on its adaptation to the site and surroundings, no imaginative fitting of it into a picture. Instead, some stock plan of a house, which is thought to be economical, is reproduced in row after row without regard to levels, aspect, or anything else but just the one point, can the building be done so cheaply that it can be made to yield a good return on the outlay? Is it any wonder, then, that our towns and our suburbs express by their ugliness the passion for individual gain which so largely dominates their creation?

"How then, it may be asked, are we to make any progress, for the passing of a Planning Bill will not change the character of the life which we see expressing itself in our dreary suburbs? And, indeed, if this desire for individual gain represented the only impulse of the citizen, it is little that we could hope to do. But happily this is not always the case. There is much that is great and splendidly co-operative in the life of our towns, and our social instinct is already highly developed by the mutual helpfulness of common life. Therefore, though town planning powers will not change the individualistic impulses which prevail, they will for the first time make possible an adequate expression of such corporate life as exists. Here, as elsewhere, action and reaction will take place; the more adequate expression of corporate life in the outward forms of the town will both stimulate and give fresh scope to the co-operative spirit from which it has sprung.

The conscious art of town building is practically a new one for us in Canada. We shall need to begin somewhat tentatively, and at first we may well be content if we can introduce order to replace the present chaos, if we can do something to restrain the devastating tendency of personal interests and to satisfy in a straightforward and orderly manner the obvious requirements of the community. Possibly other forms of beauty will be found more adapted to our present conditions. The very rapidity of the growth of modern towns demands special treatment. The wholesale character of their extension almost precludes the possibility of our attaining that appearance of natural growth which we have admired in old country towns, where additions were made so gradually that each house was adapted to its place before the next was added. We already see in the modern suburb too much evidence of what is likely to result from haphazard system of development. Modern conditions require, undoubtedly, that the new districts of our towns should be built to a definite plan. They must lose the unconscious and accidental character and come under the rules of conscious and ordered design."

Cork Floors

A quiet kitchen is much to be desired, this state of bliss can scarcely be expected. It is possible to make one's kitchen floors so noiseless that much of the kitchen noise is eliminated. The cork floor is a partial solution of the noise difficulty, as well as being absolutely sanitary, easy for the feet and impervious to water, oils and chemicals. Cork tiles are said to outwear any hard material, such as stone, metal, wood or concrete, and their elasticity prevents any abrasion or denting. In making the tiling great pressure is brought to bear upon the material—fifteen inches of loose cork filings—until a hard block of natural cork, one-half inch thick is produced. All the particles are tightly welded together by the heat in the pressure, which softens the natural gum of the cork, and there is not the slightest aperture in which vermin can hide. In laying the tiling all joints are cemented together under pressure so that the entire surface is hermetically sealed—no crack or crevice anywhere for water, dirt, germs or insects. The only cleaning needed is washing with hot water. For bathrooms, laundries, kitchens, piazzas, cork tiling is suitable, and it can be made as decorative as a parquetry floor, in all natural wood colorings, and in small or large square or oblong tiles. The New York Public Library, which will shortly be open to the public, has in it one hundred thousand square feet of cork tiling. The tiling can be laid on any floor base, and its price, laid and finished in any design, is seventy-five cents a square foot.

Rating of House Boilers

A Badly Designed House Boiler is an Unfortunate Investment at Any Price

In Canada, with our long, severe winters and the constantly increasing price of coal, the economical heating of houses is a very serious problem both financially and mechanically. The financial side is obvious to all, with coal a minimum of $6.50 per ton at Hamilton, Ont., and running as high as $14.00 to $15.00 on the prairies. The mechanical side has not received the study and attention its importance demands. Too many of our builders are content to act as though all furnaces and boilers were equally good, and consider the cheapest on the market as the best investment. While it is safe to say that 75 per cent. of those using modern steam or hot water heating apparatus in their homes do not attend or fire their boilers correctly, and hence fail to obtain from the apparatus the marked degree of efficiency the plant is capable of producing. In spite of this prevailing ignorance and mismanagement owners seem ever ready to complain about the excessive amount of coal they claim it is necessary to burn to maintain the temperature in the home at a comfortable degree.

The progressive manufacturers of heating apparatus have ever realized the importance of fuel economy and are constantly endeavouring to increase the efficiency of their product. In the case of the low pressure steam boiler it was only a few years ago when but five or six pounds of water evaporated per pound of fuel represented the limit of good service. Yet to-day some of the low pressure boilers in use have doubled this record of efficiency, and many only ordinarily good in construction will evaporate nine or ten pounds of water per pound of fuel. Thus the importance of every consumer keeping in touch with the advances in the science of heating is easily demonstrated, as constant experimenting is working wonderful changes in developing the efficiency of the house-heating boiler. Too many house owners, builders, and even architects act on the principle that "a boiler is a boiler" and "a heater is a heater," and if they are of a size, claimed by the manufacturer, sufficient to furnish the necessary heat, no further requirements are demanded. As a result, quite frequently most any make of heater or boiler is installed providing, of course, the price is low. As the furnace, steam boiler or hot water heater is the heart of heating systems, we should see that the points necessary to secure economy be embodied in the heater. The average house-heating boiler consumes in two or three seasons an amount of coal which more than equals the first cost of the boiler. The average warm air furnace consumes in one to two seasons coal which more than equals the first cost of the furnace. To the man whose income is derived from investments in stocks or bonds a return of from four to six per cent. is considered good. The manufacturer who can show a clear profit of ten per cent. net on investment looks upon his business as a profitable investment.

Further examples are unnecessary. Yet these same capitalists and manufacturers are installing or maintaining in their houses heating apparatus which are wasting from twenty to fifty per cent. of the fuel consumed—a loss so serious that if allowed to prevail in their business would ruin them financially. The vast majority of heating apparatus, steam and hot water plants especially, now in use and which were installed seven or eight years ago could be reconstructed to-day so that a saving of twenty-five per cent.

would be attained on the fuel used. Many of them with a few minor changes could be made to effect a saving of ten per cent. As this represents a fixed yearly gain in income, would it not pay to either make the necessary changes or scrap the old boiler. The progressive business man, in the course of his day's work at the warehouse or factory, would not hesitate for a moment. While there are many points by which a good boiler may be known, a thorough, practical, scientific test is really the solution of the question "What is a satisfactory boiler?"

The American Society of Heating and Ventilating Engineers are doing most commendable work along these lines. The report of their joint committee on Standards and House Heating Boilers is most interesting.

I quote from a report of one of their committees.

It is as follows:

"The Committee presents herewith, in Table I., a rating of cast-iron house-heating boilers, based upon the area of grate surface and the coal burned per hour per square foot of grate surface.

In compiling the table, your Committee has considered:

1. That the area of the grate shall be the area of the opening in which the grate is placed, measured to the outermost limits of air openings.

2. That the boiler is to be used under average working conditions, carrying steam at 2 pounds pressure; that the draft shall be sufficient to burn the number of pounds of coal per hour given in the table, and that the coal used shall be a good quality of anthracite coal having a heating power of 13,000 B. T. U. per pound of dry coal.

3. That the rating as given in the table means the number of square feet of direct radiation steam surface that can be carried by the boiler, based upon the supposition that each square foot of direct radiation steam surface emits 250 B. T. U. per hour with steam at two pounds pressure in the radiator and with air surrounding the radiator at a temperature of 70 degrees.

RATING OF HOUSE-HEATING BOILERS.

Area of grate. Sq. ft.	Coal burned per hour per sq. ft. of grate. Lbs.	Total coal burned per hour. Lbs.	Rating of boiler
1	2.67	2.67	82
1.5	2.96	4.44	140
2	3.59	7.18	226
3	4.21	12.63	390
4	4.55	18.20	585
5	4.88	24.40	780
6	5.06	30.36	975
7	5.24	36.68	1,165
8	5.36	42.88	1,405
9	5.48	49.32	1,650
10	5.60	56.00	1,890
11	5.71	62.81	2,125
12	5.82	69.84	2,360
13	5.93	77.09	2,595
14	6.08	85.12	2,915
15	6.23	93.45	3,235
16	6.35	101.60	3,485
17	6.46	109.82	3,730
18	6.51	117.18	4,010
19	6.55	124.45	4,285
20	6.58	131.60	4,545
21	6.61	138.81	4,800

This table is the result of a careful study of the whole question of house-heating boilers, and your Committee recommends that it be adopted and used by the members of the American Society of Heating and Ventilating Engineers as giving the standard ratings of cast-iron house-heating boilers.

Your Committee recommends that a committee to be known as the Committee on Boiler Ratings be appointed yearly by this Society to act alone or, preferably, in conjunction with similar committees appointed by other societies or associations, to consider all questions that may arise in connection with boiler ratings, and especially those questions arising from improper or insufficent ratings of boilers. If a manufacturer of boilers shall consider that his boiler is entitled to a rating higher than the standard rating, and shall take the matter up with the Committee on Boiler Ratings, and shall submit to it the results of tests made as hereinafter provided, the Committee shall consider the matter and shall report its conclusions to the manufacturer of said boiler, and also to the Society at its next regular meeting.

Your Committee recommends that when a house-heating boiler is tested to determine its rating the method of testing shall conform as nearly as possible to the "standard" method of testing boilers prescribed by the American Society of Mechanical Engineers, with some slight modifications, as follows:

The test is to be started by building a wood fire, raising steam, and keeping the boiler under working conditions for at least one hour. Then the fire is to be drawn and a new one made, and coal is to be added as rapidly as possible until, approximately, 50 pounds of coal per square foot of grate surface has been added. In small-sized boilers the firing interval should, preferably, be about eight hours; in medium-sized boilers, about six hours; and in large boilers, about four hours.

The steam pressure shall be maintained as nearly as possible constant during the test, and the weight of steam shall be determined either by weighing the water fed to the boiler or, preferably, by condensing the steam as it comes from the boiler, but in all cases the amount of moisture carried by the steam must be determined and correction be made therefor; and the feed water shall, where possible, be supplied to the boiler hot.

The coal used shall be a good quality of anthracite coal, having as nearly as possible a heating power of 13,000 B.T.U. per pound of dry coal; and the rate of combustion shall be nearly as possible as given in Table I. of this report.

Just before closing the test the ash-pit shall be cleaned, and at the end of the test the grate shall be dumped; and the difference between the weight of carbon in one pound of the ash during the test and the weight of carbon in one pound of the ash and coal obtained when the grate is dumped at the end of the test shall be taken as the weight of combustible per pound of ash and coal left on the grate at the end of the test.

No test shall be for a shorter period than eight hours; and observation of temperatures, pressures, &c., shall be made at intervals of at least one-half hour.

The following items should be determined by a test:

1. Date of test.
2. Duration of test.
3. Time of starting the fire.

4. Time of commencing the test.
5. The number of times fired.
6. Interval between firings.
7. Square feet of grate surface.
8. Square feet of fire surface.
9. Square feet of flue surface.
10. Total heating surface.
11. Kind of fuel used.
12. Analysis of the fuel. (Fixed carbon, volatile matter, and ash.)
13. Total weight of fuel fired.
14. Total weight of fuel left in the grates.
15. Total weight of fuel burned during the test.
16. Total weight of fuel burned during the test per hour.
17. Total weight of fuel burned during the test per hour per square foot of grate.
18. Total weight of ash and clinker.
19. Temperature of gas leaving the boiler.
20. Temperature of steam leaving the boiler.
21. Temperature of feed water entering the boiler.
22. Temperature of boiler room.
23. Chimney draft—inches of water.
24. Pounds of water evaporated during test.
25. Pounds of water evaporated from and at 212 degrees.
26. Pounds of water evaporated per pound of fuel as fired.
27. Pounds of water evaporated per pound of dry coal.
28. Pounds of water evaporated per pound of combustibles.
29. Pounds of water evaporated per square foot of total heating surface.
30. Total B. T. U. delivered to the steam from the boiler.
31. Boiler capacity in square feet of direct radiation steam surface.
    (This is obtained by dividing the total B. T. U. delivered to the steam by 250.)
32. Analysis of the flue gases.

American Practice in Taking off Quantities

Some Notes on this Most Important Subject as Presented in a Recent Paper Before the Carpenter Contractors' Association of Cleveland

Some useful hints as to taking off quantities from plans were given recently by Mr. James Young in an address before the Carpenter Contractors' Association, of Cleveland. The system followed by Mr. Young is of much interest and is worthy of the consideration of our readers. The address was in part as follows:

The first thing I do when figuring a job is to give a general glance over the plans, elevations and specifications. Then I turn to the basement plan and take off the number of feet lineal of girder and its size, whatever it may be, posts, if any, and these follow the date, name of architect and owner, as my first entries. Then, turning to the first floor plan, I take the amount of sill in lineal feet, making an entry of that and how the sill is composed. I take that measurement accurately, measuring the plan at its longest and widest square projection, thus, should the length be 58 feet and the width 42 feet, we have 116 feet and 84 feet, making the girth 200 feet. If there are any bays, I add 3 feet for each bay.

We have now not only the lineal measurement for sill, but also for studding, sheathing, etc. Then I take the superficial area of the first floor for joisting, making the entry at whatever it may measure. For instance, first floor "1950, 2 by 10 by 16 by 19," thus indicating the number of square feet to be joisted, the size of the joist, the spacing, and the average length.

I then turn to the second floor and do the same, making the same kind of entry, usually with some additions; for instance, there may be some bays or projections, which are only one storey high, with girders running across at these openings. I take the amount of such girders and the size of bays or projections which stop at first floor, because if they are not covered by the second storey joists they must have ceiling joists. Then there may be one or more projections thrown out on the second floor which are packed with mineral wool or otherwise treated. In addition, then, to the mere entry of joists for the second floor, I may have entries like these: "36 feet 6 by 10 girder, 115 ceiling joists, 130 by 4 inches wool." The fact of the entry of wool carries with it the furring and sub-floors necessitated by its introduction. There may still remain other features on the second floor to be taken care of. The first floor may have a large living room, over which the joists are 2 inches wider than the balance of the house, and set at 12-inch centers. I take the size of that room and make an entry like this: "extra on 24 by 32, 2 by 12, 12," indicating that a portion of the second floor will have joist 2 by 12 set at 12-inch centers and 24 feet long.

FIGURING ROOFS.

Having thus taken care of the second floor, I then turn to the third floor or attic, and take the measurement of it. From the attic floor I take the measurement of the roof and ceiling joists or collar beams. Unless it is an absolutely plain, straight roof I never measure it off the elevations, because I think I can measure a roof that is pretty well cut up much more accurately from the roof plan, and that in one fraction of the time required to measure each and every section or portion of roof as shown on the elevations. In the former case I know that I have got full quantity of roof, while I might be doubtful if using the latter method. No matter at what pitch a roof is it must bear some definite relation to the amount of plan area to be covered. The only thing necessary, then, is to find the various proportional relations that different pitches bear per square to the plan per square to be covered. Having determined that, you decide it not only for one roof but for all time; you have then before you the simplest of propositions, and one that can be absolutely relied upon. But this does not dismiss the matter of roof. For instance, the measurement of your attic floor for joist does not go beyond your plate line, and your roof does. Then again, there may be a deck of 16 feet by 20 feet. I believe it is better to make the entry "16 by 20 feet" than "deck 320," because the former entry gives not only the area of the deck, but also the amount of deck plate, and I think that it is particularly important to get a correct amount of the material that goes in a deck, because I question if the material in any other portion of a building costs as much to put in place.

Having a deck, then, 16 feet by 20 feet, take 320 feet off the measurement of your roof plan, and you have the amount on which to apply your proportional relation. I count the number of dormers in a roof and allow so much additional per dormer, determining that amount at the time according to the kind of roof the dormers may have. One-half of the roof plan will give the amount of space required for collar beams, I believe, as accurately as it may be obtained in any other way, and there can be surely no method quicker.

I then measure the cornices. The same cornice I measure from the attic plan, as it can be measured as accurately there, and more quickly, than by taking it from four elevations. I usually make a price per foot on the cornice at that time, embracing that portion of roof which it takes to cover it. The gable cornice I measure from the elevations, also making a price per foot on it. Then I take the amount of dormer cornice. I also take the number of feet of hip for cant boards or hip shingles, as the case may be.

WALLS AND FLOORS.

I then turn to the walls. I already have the girth of the first floor. I take the girth of the second floor, and taking the mean between the two gives the girth for the total height. My entry would be thus: "200 feet of 2 by 5 stud and sheathing." I then take the final covering, whatever it may be, siding, shingles, or timber work. If siding is used I run my eye over the number of corners on the first and second floors, add them together, multiply by half the height and I have the number of feet of corner boards, or mitered corner, as the case may be. I then measure the gables and dormers. I usually put higher price on gables and dormers than I do on the walls, because there is more waste and the work is slower.

I then take water table belting, if any, brackets, etc. I think it is well to put a price on these at the time, because it is difficult to make a note of them in such a way as to indicate their value. At this stage I go back to the attic plan, making the entry "attic." If a sub-floor is used, I simply make the entry "sub," if it is laid straight; I follow the word "sub" by the abbreviation "Diag." if the floor is laid diagonally.

I then measure the amount of finished floor, which is usually considerably less than the floor surface of the building, because the attic is usually studded in from the plate line. Then I take the number of feet of partition lineally; the number of feet of base; the number of doors, height, style and thickness; the number of windows to be cased, the number of closets, and how treated; the number of feet of cupboards, and whatever else appears on the first floor plan.

I then take the second floor in much the same way, the sub-floor, the finished floor, paper, furring, wool, if any of these are called for. If bathrooms are marked "tile," I make an entry of so many feet of tile extra, because it costs considerably more to cut in floor between joists, fitting around pipes, than it does to lay it on top.

In measuring partitions I always measure those running one way of the building first, then measure those running the opposite way. I think one is more apt to get a correct measurement by so doing than if he tries to measure them irrespective of the way they run.

INTERIOR FINISH.

Then I take the number of doors, window sides, closets plain, closets with drawers, the number of feet of cupboard, the number of mantels, medicine cases, towel closets, and whatever else may appear on the second floor plan.

If there is a room in hardwood, I take that by itself. If the hall is hardwood I will have an entry "extra on 8 veneered doors, hall"; that implies that there must be jambs with hardwood edges and hardwood finish on one side; and then so many feet of hardwood base. I usually measure the hall by itself, in any case, because not infrequently it has a wood cornice, and you may not know whether it has or not until you are studying the three-quarter scale drawings.

The first floor I treat somewhat differently. One very serious drawback to taking off quantities of interior work of the first floor is due to the fact that in many cases there is only one set of three-quarter scale interior drawings, and they are kept in the office, so that it is impossible to take off the work of any room intelligently.

For a number of years, unless the three-quarter scale drawings accompany the plans, I have adopted the following method: After taking the partitions and floors I take each room by itself, because the style of finish may differ very materially in the different rooms. An opening in one room may be cased for three or four dollars, while that of another may be worth ten dollars or more.

My entries for these rooms, then, are as follows: "Living room, birch, 3 door sides, 5 window sides, 70 feet base or wainscot, 110 feet picture mould or cornice, 10 feet of alcove beam, 2 corner pilasters, mantel." I take off each of the rooms and halls in this way, leaving two or three blank lines in my book between each room for the insertion of anything that appears on the interior drawings, but not shown on the plans.

Kitchens, pantries, store rooms, servants' dining-room, and rear halls I group the same as on the second floor, as invariably these are all of some one style. Then I take the number of feet of cupboards and any other incidentals that may appear to be called for.

I then take off the stairs. Rear stairs from basement to attic I usually put a value upon as I look at them on the plans. The main stairs I usually make a diagram of as to position of the newel, the start of the rail, the shape of the first two or three risers, the width of the stair, number of landing posts, the number of feet of level rail, which, of course, includes the well-hole casing. The raking rail will run about a foot to the tread. I make the price after seeing the style on which the stairs are built. I rarely ever lump a main stairs at so much. I figure a stair itself at so much per step, according to its design and the wood of which it is built; so much for the newel and each of the landing posts; so much per foot of rail, and so much additional for each ramp or casing.

After taking off the doors on the first floor and whatever work there is in the basement, I am done with the plans, so far as the interior work is concerned, I then turn to the elevations and take off the window frames. While I already have the number, that does not enable me to make a price upon them, as their value may vary materially. This is my method, taking each elevation consecutively; I put down on my pad the number of common double hung windows and then look at those which are special, and on them I put a value. The entry in my book then will be like this: "40 common windows, specials, $215." The only thing that is now left is porches and roofs and cornices of bays and balconies.

Porches I take by the square foot—so many feet of floor and ceiling, so many feet of roof, so many lineal of beams and cornice, so many posts, so many feet of rail, so many feet of lattice. Bay roofs and cornice I measure in with porch roofs and cornice, as they generally are of the same style and value. Balconies I take off as they may appear.

Having now completed taking off my quantities, my one object is to get the amount of surface I have to cover on the exterior and the nature of that covering, and in the interior to get the quantity and kind of the various items that go to make the complete whole. After having done this I read over the specifications carefully to see whether or not there may be something which I have overlooked in the more general reading at the first.

I have described the taking off of quantities of a frame residence; taking off the quantities of a brick residence does not vary materially, although there is not so much to take off. There is one item which I always make an entry of on a brick residence which I do not make on a frame residence, that is scaffolding.

Refinishing Concrete Surfaces

The appearance of concrete surfaces has been oftentimes marred by stains appearing on the surface, caused in many cases by chemical action in its component parts. The presence of iron frequently makes itself apparent by the brown stains upon the surface. As this is always present in good Portland cement, and as the presence of iron is also sometimes very marked in the water used in the mixing of the concrete there is constant danger of discoloration of surfaces. To prevent the undesirable gloss and shine of surface, and also to avoid efflorescence and consequent discoloring becomes at once a matter of some import in concrete construction work. While surface defects do not seriously affect the strength of a concrete structure, barring those due to imperfect forms and poorly laid concrete, they do affect the final general appearance and hinder the growing popularity of concrete work. Many plans have been resorted to to overcome the surface imperfections of concrete structures, and it is possible to make a concrete surface attractive, and even preferable to another form of structure merely from the standpoint of appearance. One means of surface finishing has been the rough, uneven effect produced by dashing a mortar mixture against the surface. This produces an exceedingly rough effect, but none the less attractive if properly carried out. Etching with an acid is also a treatment resorted to for producing a more attractive surface. The concrete is brushed shortly after the form has been removed, and is treated by a dilute acid solution—hydrochloric is a good acid—applied with a brush. This tends to remove the outward cement covering, exposing the aggregate, and producing a rougher effect. Artificial color stains are used, and they have rather more in their favor than concrete paints, since they are cheaper and can be more rapidly applied to concrete surfaces.

A surface appearance may be considered when the form is erected, and slats or small pieces of wood nailed upon the interior will allow of a desired form of finish to give the effect of cut granite blocks. It often happens that a natural cement finish is desired, and, in fact, this is oftentimes fully as attractive as artificial cut stone effects. A successful method of finishing now used to overcome the aforesaid surface defects of concrete structures is the application to the surface of sand. A cement wash is first applied to the surface of the concrete, and while this is still wet, a fine grade of sand, which has been dried, is blown against the surface. The result is that a rough surface, not unlike the surface of a natural sandstone, is obtained. This does not change the natural color of the concrete structure, but it gives a desirable surface appearance, and seems to be effective in covering stains.

Table of Properties and Costs of Concrete

Proportions.	1†.	2.	3.	4.	5.	6.
1 : ½ : 1	6.8	3.97	$.37	$.34	5,340	...
1 : 1 : 2	9.7	2.79	.314	.274	4,000	...
1 : 1½ : 3	12.6	2.14	.283 (a)	.237	3,200	835
1 : 2 : 4	15.6	1.73	.264	.214	2,700	...
1 : 2½ : 5	19.0	1.42	.246	.195	2,300	...
1 : 3 : 6	22.8	1.18	.23	.179	2,000	...
1 : 3½ : 7	26.6	1.02	.219 (b)	.169	1,785	486
1 : 4 : 8	30.4	.89	.210	.160	1,625	...
1 : 4½ : 9	34.2	.79	.205	.154	1,500	...
1 : 5 : 10	38.0	.71	.200	.149	1,400	...
1 : 5½ : 11	41.8	.65	.195 (c)	.145	1,320	347
1 : 6 : 12	45.6	.59	.192	.141	1,250	...

(a) First-class brickwork in cement mortar, 44 cents per cubic foot.

(b) Good brickwork in cement, 35 cents.

(c) Ordinary brickwork, 26 cents.

*Derived and used by the Aberthaw Construction Company, Boston, Mass.

1†. Vol. in place cu. ft.

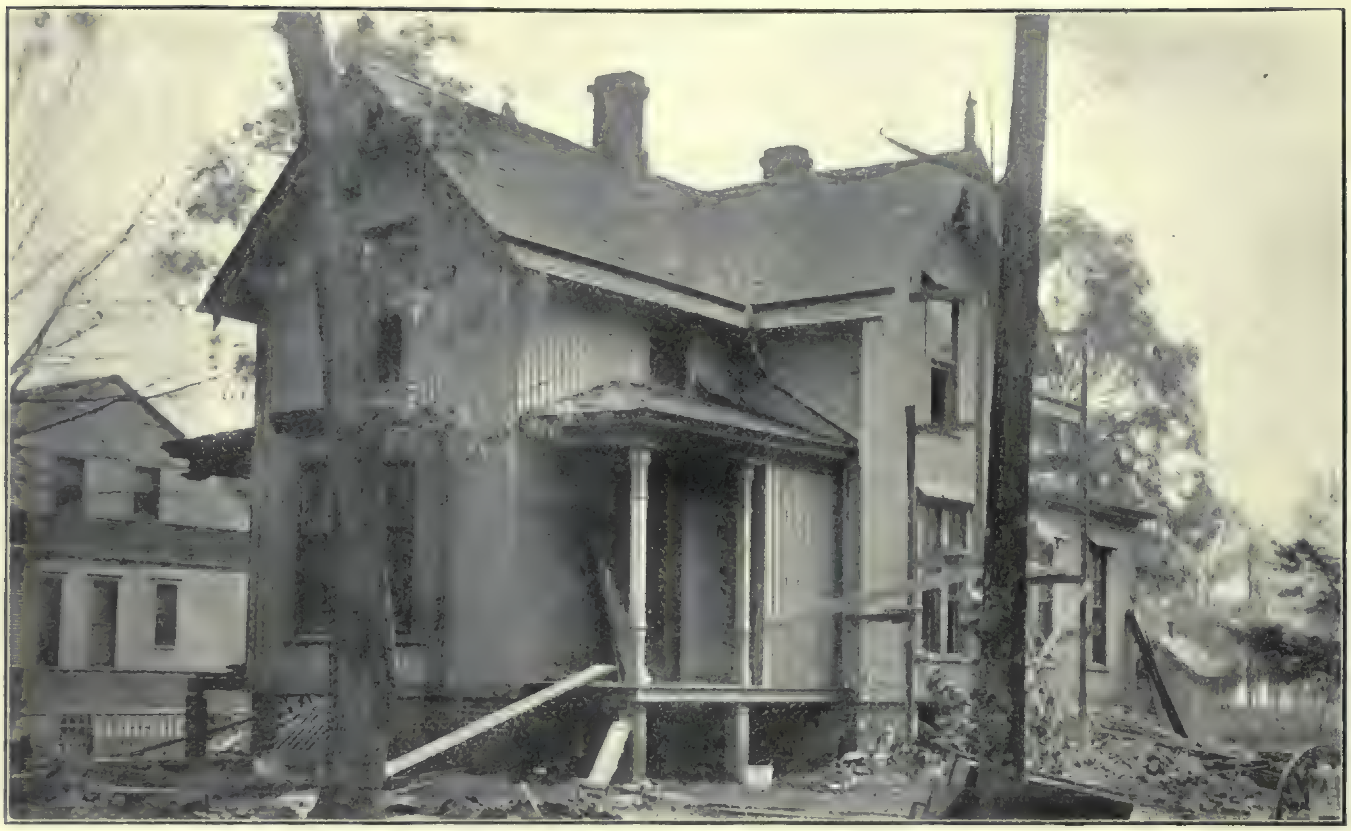
2. Bbl. of cement per cu. yd.

3. Cost per cu. ft. broken stone concrete.

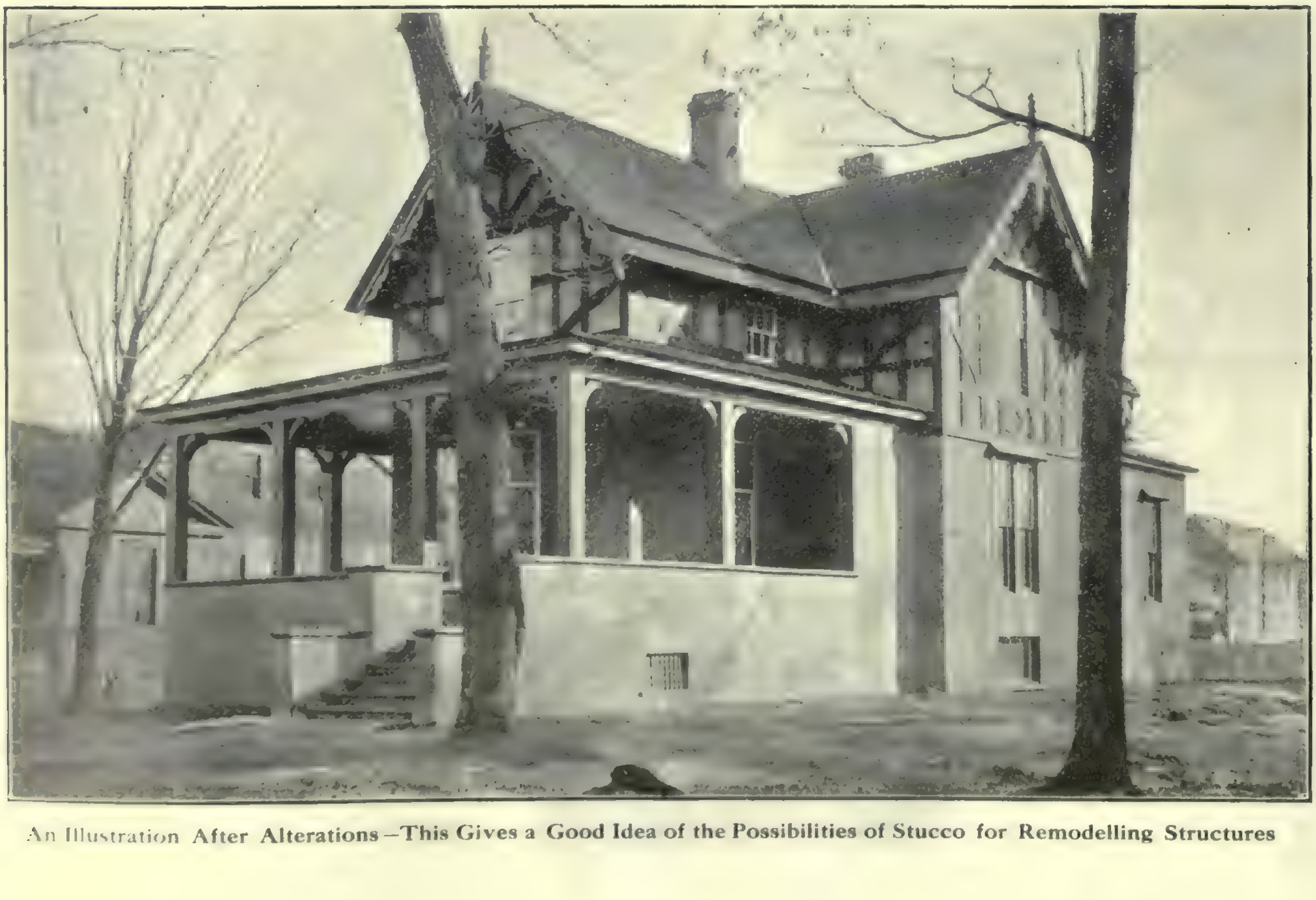
4. Cost per cu. ft. gravel concrete.

5. Ult. compr. strength broken stone concrete, 1 month old, per sq. inch.

6. V. ult. compr. strength per sq. inch of brickwork.



Frame House Before Stucco Treatment



An Illustration After Alterations—This Gives a Good Idea of the Possibilities of Stucco for Remodelling Structures

Remodelling a Frame Structure into a Stucco House

An Interesting Article Showing How the Jobbing Builder Can Increase His Income

Changing conditions, due to the growth of our towns and cities, have in a great number of cases rendered many frame structures practically useless from a renting standpoint. Perhaps the building may look dilapidated through age, or as we have it in Toronto, the permanent section and the summer resort have merged into one. The old frame structures are there, but all new houses must be of brick or some such semi-fireproof material to conform with the building by-laws.

The owners of these frame structures will be interested to know that their exterior can be easily and effectively transformed into a stucco.

This opens up a very profitable field for the jobbing builder.

Some years ago stucco was quite generally used, but owing to the failure of the materials to withstand the action of the elements, etc., this type of construction was almost entirely abandoned. In England the architects make use of it very freely, especially over brick as will be dealt with in a future article. The apparent simplicity of the treatment is apt to cause trouble, most anyone is apt to imagine that he is capable of accomplishing the work. Unless due care is exercised in drawing up specifications and in the application there will be as many failures as in the past.

So much depends on the selection of the material, proper mixing and proper application, that only skilled mechanics who are familiar with this class of work should be employed.

An examination of a few failures will show some things to avoid.

I remember one residence in particular, where there were a great many horizontal cracks in the stucco running almost the entire length of one side of the building. These cracks were about two feet apart and were very pronounced. The whole area of sides and ends was very unsightly. After a very careful investigation it was found that in nearly every instance where cracks had developed that they were at a point where the wire lath was lapped in many places less than ¼-inch thickness of stucco was over these laps. In some instances by cutting out the cracks it was found that the metal lath was not even tacked solidly in place and yet the stucco work in general was condemned by a number of parties on the results obtained on this one building. It was quite apparent that the trouble was not due to any fault of the material, but in this particular instance was due entirely to the application of the wire lath and stucco. In addition to the large cracks at the laps of the wire lath, there were a number of hair cracks throughout the entire area, which apparently were caused by too much trowelling of the concrete mass, and as was found by investigation there was a coating of frosting of Portland cement on some of the areas and the cracks penetrated just through this frosting. Other areas were entirely smooth and cracks had not developed.

In another case regular lime mortar plaster without any Portland cement was used for the scratch coat. The second and finishing coat consisted of a poor mixture of Portland cement and sand. The finish coat was only about ¼ inch thick. Moisture penetrated through the finish coat and the mortar composing the scratch coat being subjected to continued moisture disintegrated and the stucco came off in sheets.

This third case was very similar to the second, although wood lath was used instead of wire lath on a small building near the shore. The scratch coat material consisted of regular interior plaster and the second coat consisted of Portland cement, asbestos rock and asbestos fibre. The second coat was very thin and the damp salt air and moisture penetrated through to the first coat. The lath became swelled and the stucco came off in sheets. The stucco on this work was condemned and was laid at the door of the asbestos and Portland cement. Upon investigating the matter thoroughly it was readily proven that the entire trouble was due to the nature of the lath and the materials entering into the first coat.

I have just referred to these buildings with a view of cautioning people interested in stucco construction to see that this particular part of the building is given proper attention.

In the past stucco has been applied in two coats, the total thickness being about ½ inch to ⅝ inch. Past experience is teaching us, however, that 1 inch is by far better and if the material is applied in this thickness, house owners and architects should not have reason to regret the use of this material.

Another point of considerable importance is the color. A uniform color is rather difficult to obtain on smooth surfaces particularly, but it can be obtained if proper attention is given to the selection and mixing of the ingredients and it is properly applied. When Portland cement and sand are used it is very essential that the sand should be absolutely free from any organic materials which have a tendency to discolor. It is also of vast importance that the ingredients be mixed very accurately and carefully and that a sufficient amount be mixed at one time to cover certain areas exposed to the same lights and shadows.

For example, the work should not be left in an uncompleted condition half way between windows or half way down the side walls, for just as certain as this is done, there will be a streak showing where the latter work was started. If it is necessary to do a certain given area at two operations, care should be used so that the materials are properly blended and the stucco floated or trowelled to correspond exactly to that already done. By using a little care on details of this kind the ultimate results will be much more satisfactory.

Portland cement and sand as a stucco mixture has been used with fair success where work has been carefully supervised, but there has been such a lack of proper attention to the mixing and application that there have been some very bad failures.

The use of asbestos rock and fibre to take the place of sand is meeting with considerable success. The asbestos fibres have a tendency to hold the water, which is used to mix the concrete mass longer, thus giving the Portland cement ample opportunity to become properly set, and in this way stucco mixtures are possible that are more uniform in color and less liable to crack as the fibre also furnishes additional bond.

There is one point which is frequently lost sight of, that is it is possible to manufacture or make concrete slabs that are free from cracks and that can be exposed to the elements for an indefinite period without discoloration. Therefore, should a crack develop in well-constructed stucco work it can be invariably traced.

The best results are secured by plastering the exterior on metal lath of heavy guage, coated with a good quality of pure carbon paint or galvanized coating. The lath should have a small mesh for the plaster is then offered a better anchorage. The metal lath should always be furred from the studding or sheathing, as for instance with crimped steel bands or strips of wood, this will allow a better keying of the plaster and in the case of a wooden frame house the plaster will be kept away from the wood so that the moisture in the plaster will not be absorbed by the dry lumber. Such contact often produces unequal setting of the cement, which often results in cracking the plaster directly over such points of contact. Besides, the dead air spaces between the plaster and sheathing is excellent insulation against heat and cold.

The accompanying illustration gives a good idea of what can be done with an old house.

Building Material

Increases in their Cost During the Past Decade—Some Interesting Comparisons

The increase in the cost of living during recent years has been felt both directly and indirectly in the building trades. The cost of construction has been higher, due largely to the increased prices of labor and materials. Interesting light on this subject has been thrown by the report of Mr. R. H. Coats, B.A., of the Department of Labor, on wholesale prices in Canada. He takes the period from 1890 to 1909 inclusive. These are the results of his investigations:

ARTICLES	HIGHEST		LOWEST		Unit
	Price	Date	Price	Date	
a. Lumber—	$ cts.		$ cts.		
Pine, all grades, Ottawa ..	21 50	1907............	12 00	1890 92, '94-96, '98	M.
,, good sidings, Ottawa (1 x 7-in. and up)	43 00	Jan , 1909......	29 00	Oct., '96-Nov '98	M.
Pine No. 1 cuts and better, 1-in., Toronto	50 00	Nov., '05, Sept., '06, Oct., '09..	30 00	Jan., '90-July '91	M.
Laths, No. 1 white pine, 1⅜-in., Ottawa	4 25	Apr.-May, 1906.	0 90	Jan. '97-June '98	M.
Pine, shipping culls (sidings), Ottawa	27 00	Oct.-Dec., 1909.	9 00	July-Nov., 1898	M.
Pine box boards, Ottawa .	25 00	Oct., 1907......	8 00-10 50	1899............	M
,, shingles, clear butt, 18-in. *, Ottawa	2 75	Apr., 1906, June, '06, Dec., 1909	1 60	July, 1900-Feb., 1902	M.
Hemlock, Ottawa †.......	14 00	Oct. '06, Sep. '08	12 00	Oct.-Dec., 1909.	M.
Spruce. merchantable Deals, N.B.	15 50	Nov. & Dec. '09	9 00	Jan.-Mar., 1893, Jan.-Mar., '96, June, 1896	M.
Cedar shingles, St. John, N.B. (extra and clear brands)	3 30	June '07, Dec. '07 Mar., '08, Apr., '08, June, '08	1 30	Oct.-Dec., 1896, Jan.-Feb, '97, June-July, '97	M.
Birch, com. and better, 1-in., Toronto	26 00	Jan.-Feb, May-June, 1909	17 00	Feb. '93-Nov '94	M
Maple, soft, com. and better, 1-in. Toronto	22 00	Mar., '04, Feb, 05, Apr.-May, '06, Aug., '06-Aug, '07	15 00	Oct.-Nov., '94..	M.
Oak, red, plain, 1sts and 2nds, 1-in., Toronto	53 00	Sep.-Nov., 1909	22 00	Apr.-Sept., '93.	M
b. Paints, oils and glass					
Benzine, Canadian	0 25	Mar. '03-Ap. '04	0 12	June-Aug., '91.	Gall.
Glue, domestic broken sheet	0 13	July, '99-Jan. '03	0 08	Feb '03-Aug. '07	Lb.
Linseed oil (raw)	0 83	June-Aug. 1900, July, 1902	0 40	Aug , 1897......	Gall.
(boiled)	0 86	June-Aug. 1900, July, 1902	0 43	,, 1897	..
Paris Green. Eng. and Can.	0 29½	July, 1907......	0 11	July, 1897......	Lb.
Prepared paints, 1st quality (pure)	1 30	Mar. '07-Dec. '09	1 00	Nov.-Dec., 1893, Sept., '94, July '95, Sept., '95, Feb , 1900	Gall.
Putty in bladders.........	2 25	Nov. '01-Jan. '03 Oct. '03-Feb. '04	1 65	Jan. '05-June '05 Aug. '05-Jan. '06	100lbs
Rosin, white..............	12 60	July, '07-Dec. '09	2 50	Sept. '94-Ap '95	280 ..
Shellac pure orange in bbl.	4 00	June '00-Nov '01	1 65	May-June, 1908	Gall
Turpentine	1 10	Nov., 1905.....	0 37	Oct., 1895......	..
Varnish No. 1 furniture, in bbls.	1 60	June '00-Nov '01	0 45	Apr.-June, 1899	Gall.
Venetian red, dry colour.	1 80	Aug., '93-Sept., 1901	1 50	Jan., '90-Jul., '93 Oct.-Dec. '01.. Mar. '03-Dec. '09	Cwt.
White lead, pure, ground in oil	0 07¾	Oct., 1907......	0 04¼	Nov. '94-June, 1895	Lb.
Window glass, star, under 26-in. (1st break)	4 25	Nov. '00-Dec. '01 Feb, '03, Nov., 1905-Dec, '07, Apr, '08-Dec., 1909	2 05	Oct.-Nov., '95..	Box.
c. Other building materials—					
Bricks, ordinary building, 1st quality	11 00	Apr., 1905-Mar. 1906, Jan., 1907 Dec., 1909	7 00	May, 1897-Jan., 1899	1,000
Bricks, fire................	23 00	June '90-Oct. '91	15 00	Aug.-Sept., '94, June, '95, Feb., 1897	1,000
Cement, Canadian Portland (carload lots)	3 20	Jan.-June, 1890	1 50	Nov.-Dec., 1909	Bbl.
Lime, high calcite (95% 97%)	0 24	1909...........	0 15	1899...........	Bush
Plaster of Paris..........	2 10	1907...........	1 55	1890, 1893-4	Bbl.
Nails, cut 3-in. (3d nails) .	3 50	Feb. '00-July 00	1 85	Aug.-Dec, 1897	Keg.
,, wire ‡.............	3 40	Feb.-Apr., 1900	1 75	Oct., '98-Jan. '99	,,
Tar, crude coal (pure) § ..	4 00	June, 1894-Apr. '96, Jan, 1902-Jan., 1908	3 50	Mar., '00-Dec., '01, Feb., 1908-Dec., 1909	Bbl.
Pitch §............	2 50	June '94-Ap. '96	0 60	Jan.-Feb., 1900	,,
Hinges, heavy............	0 6½	Dec., 1909......	0 03¾	Apr., '94-Sep. '95	Lb.
Sash weights..............	0 3¼	Sept., 1899-Dec. 1900	0 01	June, '95-Aug., 1898	,,
Soil Pipe, 4-in. medium...	0 26	Jan.-June, 1890	0 15	July, '95-June, 1896	Foot
Wire cloth, painted screen	2 25	Jan. '90-Feb. '91 May-June, '91	1 20	Feb. '98-May '99	100 s.ft
Wire fencing..............	5 75	Jan.-Apr., 1890.	1 80	Feb.-July, 1898, Oct.-Dec., 1898	100 lbs.

* Record from 1900 to 1909 only. † Record from 1906 to 1909 only.
‡ Record from 1897 to 1909 only.

In dealing with lumber, the object has been to make the statistics as representative as possible of trade conditions in this important industry through Canada. As representative of the lumber industry in the Maritime Provinces, New Brunswick shingles and New Brunswick spruce are taken. Some difficulty was experienced in selection of grades that would actually represent the great lumbering industry of Ontario and Quebec. In the case of pine, a high grade product, a medium grade product and a low grade product at Ottawa are chosen. A high grade pine product at Toronto, as representing the output of the Georgian Bay mills, is added. Of recent years, with the increase in the price of pine, hemlock as a cheaper substitute has come into extensive use, and is added for that reason, though it reflects closely the tendency of lower grade pines.

Perhaps the best criterion of lumber tendencies in this connection are the figures which were obtained from certain large manufacturing concerns of the Ottawa valley, showing the average price at which their entire cuts were disposed of from year to year back to 1890. Though the quality of the logs may have varied in different years, thereby entailing variations in the apportionment of grades, the figures in question are based on the outputs of several mills, with the result that this tendency is probably obliterated. The figures show a rise from $12.00 per thousand feet in 1890-2 to $21.50 per thousand in 1907, the high year. In the case of hardwoods, birch, soft maple and red oak at Toronto have been quoted.

The trend of prices of British Columbia lumber prices during the past twenty-five years is indicated in the following table which shows the average prices at which lumber cut on Dominion lands in the railway belt was sold:

From 1884 to 1902........	$10.00	per M. feet, B.M.
Year 1903	15.27	"
" 1904	15.30	"
" 1905	14.95	"
" 1906	14.95	"
" 1907	16.25	"
" 1908	17.00	"
" 1909	14.20	"

It will be seen that after a period of stationary price (1890 to 1895), lumber prices declined somewhat in 1896, 1897 and 1898. Since the latter date, however there has been a very pronounced upward movement, which reached its culmination in 1907. Subsequently, there was a falling off until the closing months of 1909, when some recovery was made. The increase in the case of pine amounted to fully 70 per cent. The higher grades have been steadier, but the lower grades have mounted very rapidly. The highest rise is shown in the case of pine laths, which more than quadrupled in price between 1897 and 1907, and were in 1909 over 130 per cent. above the average of 1890-1895. New Brunswick lumber advanced 50 to 60 per cent. in the decade 1898-1908. In the hardwoods, the rise, as compared with the ten-year period, has been between 25 and 30 per cent., except in the case of oak, which advanced over 80 per cent.

In explaining these pronounced advances in a product so important as lumber, the manufacturers point to several agencies which have combined to enhance operating expenses. Supplies for the camps have advanced. Wages also have been increased, while the supply of experienced help has greatly declined, so that at the higher rate a less efficient staff of employees is available. The timber, moreover, is not so good as formerly, the logs being smaller, entailing a greater loss in driving, and a less return from a like amount of handling. The merchantable timber is found at increasing distances from the main streams. Added to this there has been a marked advance in stumpage rates; limits that sold at $3 to $4 per thousand in 1890 are bringing $8 to $10 per thousand at the present time.

Miscellaneous building materials, including bricks, cement, lime, plaster, and representative articles of builders' hardware, show an increase in prices during the decade of 5.7 per cent. Here are the details:—

Bricks.—Common building bricks were 46 per cent. higher in 1909 than in the decade 1890-1899. Since 1898, the low year, they have risen over 70 per cent. Fire bricks, on the other hand, have gone down, as compared with the decade, by 8.5 per cent, but are higher than in 1896.

Cement.—Canadian Portland cement was lower in 1909 than in any previous year quoted, being 37 per cent below the decade 1890-1899. The highest year shown was 1890, but there was an upward movement in 1899-1900.

Lime.—Lime had advanced steadily during the past ten years, being 27.6 per cent above the average for the base decade in 1909, and approximately 50 per cent higher than in 1898. Prices between 1890 and 1898 declined about 20 per cent.

Nails.—Cut nails were lower in 1909 than in 1907. The highest year shown was 1900 (126.3), and the lowest, 1897 (81.2). Wire nails, which are now in such extensive use, did not appear in the trade journal quotations prior to 1897. They are somewhat higher at present than in that year, and are 20 per cent higher than in 1898, the low year. As in the case of cut nails, the high year was 1900, since when the decline has amounted to fully 33 1/3 per cent.

Pitch and tar.—Crude coal tar is lower than during the decade 1890-1899 by 12.5 per cent. Pitch (Sydney roofing) has also declined considerably during the past eight years, but is higher than during the decade 1890-1899.

Hinges, etc.—The quotations for heavy hinges show a pronounced rise since 1897, amounting to approximately 45 per cent. Sash weights are over 50 per cent higher than ten years ago, but have been higher still in the interval. Soil pipe has shown little change for some six or eight years past, but is higher by over 30 per cent than in 1896, though lower than in 1890.

Wire fencing.—Wire fencing declined very rapidly from 1890 to 1898, the price in the latter year being only about one-third of the former. Subsequently there has been a recovery of about 40 per cent, but prices are still 30 per cent. lower than during the base decade. In the case of wire cloth, the course of prices was somewhat similar, though fluctuations were less violent. Prices are now approximately 35 per cent. below those of the base decade.

Fourteen articles are included under the heading of paints oils and glass. Averaging the whole, prices in 1909 were over 35 per cent higher than during 1890-1899. There was a decline of six points since 1907. The lowest year was 1897, since when the gain has been over 40 per cent. Between 1890 and 1897 a gradual fall, amounting altogether to 14 points, occurred.

Benzine.—Prices have ranged from 12c. to 15c. per gallon within the 20-year period. In 1909, they were 25 per cent above the base average. The highest year shown, however, was 1903, when prices were 87.9 per cent. above those of the base decade. The low year was 1898.

Glue.—Prices showed only minor fluctuations. They were lowest in 1897, since when they have recovered to a point little removed from the average of the base decade.

Linseed oil.—Linseed oil, raw and boiled, declined from 1890 to 1897, but rose thereafter rapidly until 1901. There was a decline in 1904 and 1905, followed by a recovery. Prices are now approximately 10 per cent above the average of the decade 1890-1899.

Paris green.—The highest year shown was 1907 with prices 76 per cent above the average for the base decade. Prices are now 15 per cent above that average, a gain of 27 per cent compared with the low year of 1893.

Prepared paints.—Quotations for a standard grade of pure prepared paints show prices higher in 1908 and 1909 than at any previous time in twenty years. Compared with 1897, the gain amounts to approximately 30 per cent.

Putty.—Putty is somewhat lower than in 1902-1903, but is on about the same level as in 1896-1897. The lowest year was 1905, since when there has been a gain of nearly 14 per cent.

Rosin.—In rosin, prices were low from 1890 to 1896. They rose abruptly 37 per cent in 1897, and continued on or about the same level until 1903 when a further pronounced rise amounting to at least 40 per cent took place. Since then there have been still further and very material increases each year until 1908-1909. Prices are now approximately four times those of twenty years ago.

Shellac.—Shellac reached its highest level in 1904-1905, when it was about 30-40 per cent above the average for the decade 1890-1899. In 1909, it had declined to 13 points below that average, being lower than at any previous time shown.

Turpentine.—Turpentine was somewhat high in 1890 and 1891, but had fallen by 33 1/3 per cent in 1896. There was a steady and very rapid rise from the latter year until 1900. After a decline in 1901 the rise continued until 1906, when prices were 82.5 per cent above the normal. There was a recession in 1907, and a further recession in 1908, followed by a slight gain in 1909, when the average was 22 per cent above the decade 1890-1899, and approximately 50 per cent above the prices of 1895-1896.

Varnish.—Varnish has been on a high level since 1901, the highest point being reached in 1902. In 1908 and 1909, prices were approximately 35 per cent above those of the base decade. The low year was 1899 since when the rise has amounted to approximately 50 per cent.

Venetian red, dry color.—Fluctuations have been within a narrow range for the past twenty years.

White lead.—From the low year 1896, until the high year 1907, the gain has been approximately 55 per cent. Since 1907, however, prices have receded, though in 1909 they were still 17.5 per cent above the normal of the decade 1890-1899.

Window glass.—The 1909 prices were over 90 per cent higher than those of 1895, the low year. Prices were high in 1890, but declined rapidly during the ensuing five years.

The Prohibition of the Main Drain Trap

Is it Better to Require an Intercepting Trap and put in a Fresh Air Inlet, or omit the Trap and Vent the Street Sewer through the Drainage System?

Whether it is better to require an interception trap and put in a fresh air inlet, or omit the trap and vent the street sewer through the drainage system is the problem which is to-day causing considerable discussion among builders, plumbers and sanitary departments. Opinions differ on this much-mooted question, but the trend of public opinion at the present time seems to be in favor of the omission of this obstructing device, so that sewage will have a clear channel of waterway from the fixture trap to the house sewer.

Recent investigations carried on at the instance of the National Association of Master Plumbers, to determine the nature of drain air and the probability of the house drains and drainage systems providing channels of communication for the passage of the bacilli of disease from one house to another, would seem to furnish the greatest argument against the advocates of the main drain trap.

The question was recently discussed in the Plumbers' Trade Journal of New York, along the following lines:

"The most forceful argument ever voiced against the omission of the main drain trap was to the effect that the trap cut off drainage systems within a building from communication with other drainage systems in the neighborhood and with the street sewer. That if the main drain trap were omitted and a disease like diphtheria, scarlet fever, smallpox or typhoid fever were to break out among the inmates of the house, infectious matter would find its way through the drainage system of that house into the sewer, where the infectious matter would infect the drain air; the air, passing into neighboring drainage systems, would infect the air within them, and if any of this infected air could escape into the dwellings it might infect the inmates. If it didn't, passing out through the vents above the roofs, it would still prove a menace to the neighborhood.

This argument has finally been disposed of, however, by recent investigations which show that the air of sewers and drains is particularly free from harmful bacteria, and that danger of infection from this source is more of a bogey than a reality.

Opponents of the trap, on the other hand, objected that when one was used a fresh air inlet had to be installed, which opening, as it was bound to, near the street curb, at the grade line within a yard, or at the foundation wall, was bound to prove more or less of a nuisance, for the back puffs of air, when the current was reversed, either by wind blowing down the vent stacks above the roof, or on account of a large flush of water in the soil pipe, were anything but agreeable to those who were exposed to the foul air at the time. Further, they maintained, not without reason, that in a majority of cases, after a few years, the fresh air inlets became obstructed and were therefore useless, in which cases it would have been much better had the main drain trap and fresh air inlet been omitted.

That there was good sound reason in these arguments is evidenced by the many expedients resorted to with the object of preventing the obstruction of the fresh air inlet, and to dissipate the foul odors coming therefrom, so as not to be an offensive nuisance. One suggestion which was but little resorted to in practice was to extend the fresh air inlet above the roof, letting it terminate there like all the other soil, waste and vent stacks.

In low buildings this might not have been objectionable, but in skyscrapers, carrying the fresh air inlet to above the roof, would be out of the question; and to provide an alternative, the curb box was adopted as a compromise. The curb box, however, was very liable to become filled with dirt, or covered with snow and ice in the winter, and again ingenuity suggested compromises in the form of hollow stepping blocks at the curb line, located over the mouth of the fresh air inlet and perforated on all sides, for the escape of foul air and the intake of fresh air, or perforated only on the street side, so that foul air could not puff out into the faces of pedestrians.

A hollow hitching post, of hollow design and perforated, which could be calked to the fresh air inlet pipe at the curb, was another suggestion; but both hitching posts and stepping blocks are objectionable in any large city where the curb inlet would be most in requisition, so that the remedy defeated itself.

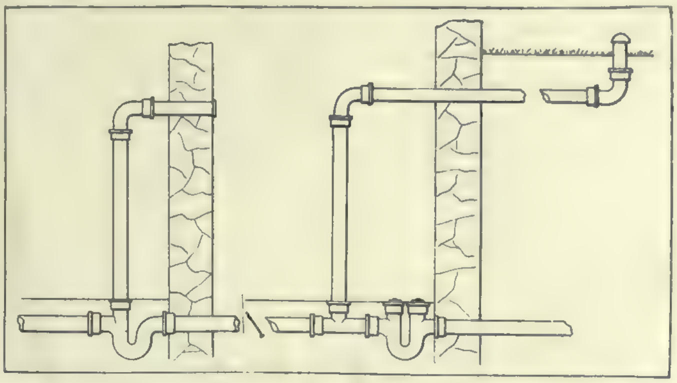


Fig. 1—Old Method of Installing Main Trap and Fresh Air Inlet

Fig. 2—Correct Method of Installing Main Trap and Fresh Air Inlet

Some ingenious anti-blow-back devices have been patented to prevent the puffing out of foul air from the fresh air inlet during a blow-down, and which stood open or readily opened, when there was no back pressure on the system; but these devices never came into extensive use, and the necessity which called them into being is fast passing away.

Another argument against the main drain trap is that it retards the flow of sewage to the main street sewer. There can be no doubt but that the premise in this case is right. Nobody who has ever examined a main drain trap will deny that, to a greater or less extent, it retards the flow of sewage, sometimes to such an extent as to become completely plugged with coarser particles which should have passed direct to the sewer. That is not as it should be, for once sewage or waste matter is discharged into a fixture, there should be no hindrance or no obstruction to its direct passage into the street sewer.

Every unnecessary trap, every unnecessary bend, every unnecessary fitting, every unnecessary size in the diameter of pipe, and every unnecessary foot of pipe through which it must pass, is just that much of an error against the correct principles of design, and in so far as they retard the flow of sewage, they are that far wrong in practice.

If a drainage system is correctly designed and proportioned for the amount of waste water it is designed to carry at all times, the interior of the pipes will be flushed thoroughly clean. It is only when pipes are too large, or contain unnecessary traps, that sewage is maintained in the system to seethe and ferment and putrefy.

The omission of the main drain trap, with its complement, the fresh air inlet, is a step towards simplifying plumbing systems and simplifying plumbing systems goes a long way towards perfecting them. Complication in any line is a trend away from perfection, and plumbing systems, until within recent years, when a reflex movement set in, were complicated in the extreme. Besides simplifying plumbing systems, omitting the main drain trap and fresh air inlet, decreases the cost of installation, in accordance with a well known law of commerce and compensation, increases the amount of work done, and the consequent profit to the plumber.

Another benefit resulting from the omission of the main drain trap which must not be overlooked is the copious ventilation of the public sewer which will ensue if each drainage system within a building is put in without a main drain trap to cut off the currents of air through these systems. Consider, for instance, the ventilating effect of the hundreds of thousands of soil, waste and vent stacks in a large city, where the main drain traps have been abolished. In some buildings occupying a plot twenty-five by one hundred feet, as many as six double stacks of soil and waste pipes are to be found, and if there was no main drain trap to cut off the drainage systems from the street sewer, what a volume of air would be drawn out of the sewer by the stacks in each building during twenty-four hours.

Consider that without expense to the owner or the city, an efficient system of ventilation is in operation at all hours of the day and night; one which cannot get out of order, and which is positive as day and night themselves.

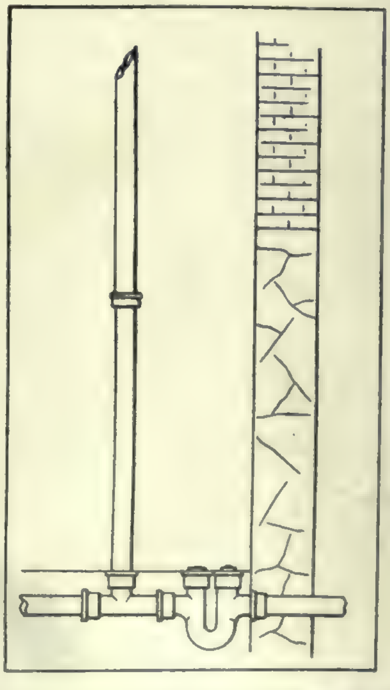


Fig. 3—Fresh Air Inlet Carried Through the Roof,

The air in the street sewers when drawn into these underground caverns becomes chilled, but that within the drainage system is warm and charged with hot vapor, which makes it light. The soil, waste and vent stacks pass up in kitchen, bathroom, or some other part of the house which must of necessity be kept warm. Likewise the house drains, which are generally located in the cellar, are exposed to the heat of the furnace and the heat of the warm air. The heat of the cellar and living room warms the drain pipes, soil, waste and ventstacks, which in turn impart some of the heat to the air within. This lightens the air and a constant circulation of air is continually taking place day and night, from the street sewer, through the drainage systems and out above the housetops, where a plentiful dilution with pure air renders it unobjectionable.

In some buildings, of course, there will be a reverse current of air, drawing in a supply from the atmosphere above the roof, and after passing through the drainage systems of those houses and part of the street sewer, out again through other drainage systems to the house tops, charged with whatever impurities were picked up on the journey. It matters not, of course, whether the circulation is up or down, so long as there is a change of air within the sewer and drains.

In some cases weather conditions or local disturbances might be such that the air will be taken in at the vent outlets above the roofs and discharged at the perforated manholes at the streets. But whatever way the air circulates, this much is positive, there will always be a positive circulation of air so long as there are differences of temperature at various parts of the sewer system and in different buildings.

It is more than probable that the retention of the main drain trap and fresh air inlet in plumbing is doomed. The foremost students of sanitary science and authorities on plumbing practice have been opposed to it for years, but once a practice becomes established in any calling it requires decades to crystallize public sentiment for a change.

At the present time there are comparatively few cities throughout the United States in which the main drain trap and fresh air inlet are required by the terms of the plumbing code, and in those cities the chances are that at the next revision the requirements will be repealed. Reforms and forward efforts move slowly, and those who have committed themselves to one policy are generally the last to acknowledge their error and adopt the new. That, perhaps, is the chief reason why, at the present time, cities still can be found which require the main drain trap. That it is doomed, however, there is no gainsaying, and the chances are that within the next decade will see the passing into total oblivion of this relic of early plumbing contracts. It has had its day, and like everything animate and inanimate, having crossed the stage, must make its exist.

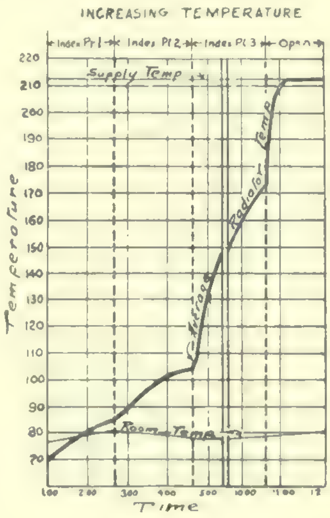
Regulation of Radiator Temperatures

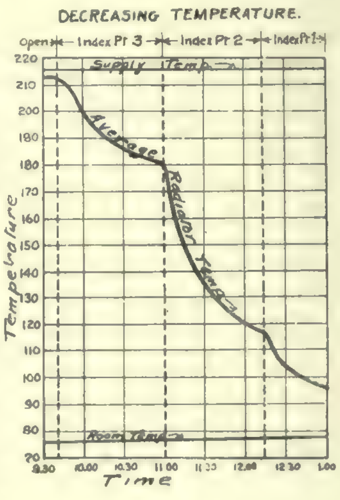
Experiments have recently been made by Warren Webster & Company in their laboratory at Camden, N.J., which show some exceptionally interesting and instructive facts regarding the possibilities of modulating the temperature of steam radiators. This is accomplished by the use of a modulation inlet valve with an automatic air and water discharge valve.

The impossibility of throttling a steam radiator equipped with the usual plain inlet and discharge valves is well enough known to need no comment. With such an outfit the cutting down of the steam supply is inevitably followed by backing up of water in the radiator accompanied by water hammer, gurgling, or similar manifestations.

In order to be able to regulate the amount of steam entering the radiator by means of any type of inlet valve, it is absolutely necessary that the discharge from the radiator be sealed in such a manner that whatever air and water may be contained in the radiator will be expelled into the returns and at the same time the escape of steam will be prevented. If this condition can be brought about the regulation of radiator temperature is simplicity itself. It is necessary only to control the amount of opening at the inlet end to limit the extent of radiating surface in action, and the average temperature of the radiator. The effect is the same as if the entire radiator were divided into a number of separate sections, any or all of which could be placed in action at the same time.

In the tests referred to it was desired to determine the exact extent to which the Webster Modulation Valve in conjunction with the Webster Water Seal Motor actually controlled the radiator temperature. Two runs were made. In the first the Modulation valve was entirely closed at the start, being opened step by step to the wide open position. Three intermediate stages were recorded, namely index points of 1, 2 and 3, which correspond to similar graduations on the dial of the modulation valve. These points are merely indicators of the extent of valve opening, and do not necessarily show the proportional amount of steam admitted or of surface in action. In the second run this operation was reversed, starting from a full head of steam on the radiator and with the modulation valve wide open and going through the graduations in the reverse direction to Index point 1. A glance at the two curves reproduced shows at once the decided effect upon the average temperature of the radiator caused by these changes in valve opening. This system of radiator control has given satisfaction in numerous installations, but no previous data have been published showing actual test results; these curves will therefore be of especial value.





The Textile Principle in Brickwork

Good Brickwork is the Successful Weaving of a Fabric of Well Burned Clay and Cement Mortar

In line with the progress made in the manufacture of the modern brick, the firm of Thomas Moulding Co., Chicago, has issued a little booklet entitled "Artistic Brick and Textile Principle in Brickwork." This handsome little pamphlet is a real work of art from the printers' point of view, but more than that, its contents are of the utmost value and interest. The artistic advances made in the manufacture and use of brick are fully set forth and particular importance is given to the modern wire-cut rough face brick, of which this firm mages a specialty, one of their most important brands being the "Textvr" brick. We quote from the book as follows:

"Good brickwork is the successful weaving of an imperishable fabric of well-burned clay and cement mortar. It has three artistic elements: texture, color, and design.

Texture.—There is a direct analogy between a piece of woven fabric and a wall of brick. The relative size of the differently colored threads and the distance they are placed from each other determine the texture of the cloth, while the relative size of the brick, their color and finish, and the distance they are separated from each other by mortar joints, determine the texture of the wall.

Color.—Color is given by blending the shades of the brick with the color of the mortar joint. The influence of the joint upon the color of the brickwork can be understood when consideration is given to the fact that the mortar joint constitutes from one-tenth to one-fifth of the surface of the finished wall.

Design.—The bond (or relative position of the faces and heads of the brick as laid), determines the design. These bonds, or brickwork patterns, are standardized and illustrated in every architectural book that treats of brickwork and add immensely to the interest of the wall. By their intelligent employment the architect is enabled to incorporate designs into his walls without departing from the structural material.

"The average building is seldom subjected to close scrutiny. The larger the structure, the greater the distance from which it must be viewed to see it in its entirety. So, in determining the texture, color and bond of your brickwork due consideration should be given the ensemble, as seen from a sufficient distance to give an idea of the entire building, rather than any single portion.

"Since texture is given a wall by the materials used in its construction and the method of their employment, brick offers many advantages to the architect and builder. It is easy to handle (being made in relatively small units) and its shapes and sizes are varied to suit every requirement. It lends itself to the use of joints of different widths, and combines with its artistic elements a permanency possessed by no other structural material.

"Recent developments in brickmaking have produced a range of colors which is remarkable, when it is understood that no artificial coloring enters into their composition. The skillful mixture of different clays, and the various methods of burning them, produce surprising results, and the relative smallness of each brick to the finished wall makes brickwork particularly susceptible to artistic color-treatment. In painted surfaces we must necessarily have monotones. With cement-stucco this defect has the additional drawback of offering a very different variety of permanent colors, and where stone is used it must be in large blocks which present great planes of a single color.

"It is unnecessary to add that brick offers opportunities for design superior to other materials, not only through its ease in assembling colors, but in the facility with which the jointing may be used to accent the pattern we are weaving.

"A coarse fabric, with contrasting heavy threads, is chosen when we select a garment which will not show dirt. Why not apply the same logic when we select the permanent garment with which to clothe our habitations? A rough-cast stucco wall tones down through exposure and has elements of beauty even after a long period of use—elements of beauty which would be altogether lacking in smooth plaster. The same may be said of brickwork, if given texture by rough-surfaced brick and free mortar joints, will withstand the action of the weather. If we add the diversified colors which are possible only in brick, we insure life and interest long after Time has toned down the contrasts and have a fair promise of a graceful old age.

"Rough-surfaced brick have another and extremely important point of superiority in the fact that they maintain their colors even in the strongest sunlight, where smoother-faced materials give back only a glare of white. Color is so important a factor that it seems irrational to spend time and thought in its selection and then reap the benefit only when the sun stops shining.

"Following the same precepts in art which have made burlaps and tapestries replace the satin sheen of glazed wall-paper, and given us Craftsman furniture instead of the gilt and velvet of a generation gone, rough surfaced brick has an added merit in that it brings its weathered effect out whatever the weather is. It enables the builder to select stronger gradations of color than would be possible with smoother materials, and blends his work into the landscape, since it gives him Nature's own colorings in which to weave his brick-and-mortar fabric."

Some Glass Notes

An exchange gives the following method for drilling holes in glass: Secure an old three-cornered file the size of the hole desired in the plate and grind two sides of it to a point. This file can be put in, held and turned the same as a bit in an ordinary carpenter's cog-wheel brace, operated by a handle. Lay the glass on a smooth surface with a small piece of cloth under the place where the hole is to be drilled. Take some soft putty and make a small ring around on the glass and fill the cuplike place with turpentine. Take the brace with the drill and begin as if boring in wood. Use a slight pressure on the brace, and in a short time you will have a clean-cut hole. A hole can be drilled in this way through the heaviest plate glass made.

Paints For Interior Wood Work

The Treatment of Interior Woods—The Nature of the Finishes and How to Obtain Them

The different varieties of wood and the various finishes used on the woodwork of a modern house call for the use of many vehicles and pigments. If the woodwork is to be finished in its natural state it may have to be oiled or shellaced previous to the varnishing. For light colored woods, white or bleached shellac is generally used, and the orange shellac for dark wood. Shellac varnish for the purpose is made by dissolving from 4 to 8 lbs. of shellac in a gallon of alcohol. Special denatured alcohol (90% grain with 10% wood alcohol) is used as a solvent and the varnish is generally sold as 4, 5, 6, 7, or 8 pound cut, meaning that so many pounds of gum per gallon were used in the cutting or dissolving.

The varnish used for natural finish may be "Hard Oil Finish," "Pale Interior Finish," "Durable Interior Varnish," or any other appropriate name. The price will govern the quality, and if cheap you may rest assured that it will contain no other gum than rosin. A medium good grade of interior varnish should contain some hard gum, either Manila or Kauri, and an extra good interior varnish should have the hard gum predominate. Varnish gums, linseed oil and turpentine are expensive, and it is not even reasonable to expect a cheap varnish to be made entirely of such materials.

The priming of interior woodwork, where it is to be second coated, finished in the flat, or with a gloss, must be governed by the result desired. As a rule, more turpentine must be used for interior paints than those designed for exterior work, otherwise the excess oil will cause the paint to turn yellow. Sunlight bleaches and darkness develops the yellow color in linseed oil.

For a very nice job, many painters use a small quantity of pole body varnish with the paste paint and thin with turpentine. It is claimed that by this method the paint dries harder and is not so liable to spot.

The paint used for priming interior woodwork must be of good quality, and should dry hard in a relatively short time, as it is absolutely necessary that the priming coat be thoroughly dry before applying the second coat. Lead and zinc, or any good combination paint may be used for interior work, less white lead and more zinc oxide or other similar base being permissible in such cases.

If the work is to be finished with oil colors the priming may be thinned with half oil and half turpentine, but for enamels, rubbed work, etc., the primer should consist of one-third oil, one-third turpentine and one-third pale, quick-drying varnish (damar varnish should not be used as a primer). A standard rule in painting is that the under coat must always be a little harder and more dry than the following coat to allow for contraction. A quick-drying paint over a slow drying elastic paint will invariably result in a cracked surface.

Oil colors for second and third work are thinned according to the result wanted; a fairly flat finish is obtained by thinning with turpentine; and egg shell gloss with half oil and turpentine and pale mixing varnish. A dead flat finish in lead is obtained by washing out the oil in keg-lead with turpentine and then thinning the nearly oil-free paste with turpentine in brush consistency.

"Zinc Finish" is the name given to work which is to be finished in white and have a high lustre, usually, two coats of semi-flat (zinc oxide ground in damar varnish and reduced with turpentine) over a lead primer are necessary before applying the finish. The finish is simply pure zinc oxide ground in damar varnish. By thinning with damar a brilliant gloss is obtained. Damar varnish is made by dissolving damar gum in turpentine. The gum is cut cold by agitation; 5 lbs. of gum to a gallon of turpentine gives a thin cut, 8 lbs. a medium cut and 10 lbs. a heavy cut.

Enamels differ from zinc finish in that a special oil varnish is used in place of damar. A pale enamel varnish which dries quickly and has a brilliant lustre is the medium used for the preparation of enamels. The pigment, lithophone or zinc oxide, is ground in the varnish to a stiff paste and then brought to a brush consistency with a mixture of enamel varnish and turpentine. Some enamels contain a small per cent of poppy oil, or of bleached linseed oil.

Varnish Colors are sometimes used for interior work, many of the so-called dark-colored enamels being nothing more or less than varnish colors. Varnish colors are made in three different ways, viz: by mixing colors ground in oil with a quick drying varnish; mixing colors ground in japan with a slow drying varnish; and by grinding the dry pigment in varnish. In the latter case, the light gravity pigments known as "toners" are used.

Owing to the absence of direct sunlight, many pigments which fade on exterior work may be used for interiors. Tints made with chrome green, the umbers, para red, vermilion, some of the lakes and Prussian or Chinese blue stand very well. Alizarine lake, carmine lake and scarlet lake are quite permanent, but chatemuc lake and rose lake, rose pink and geranium lake either fade or become brown.

Wood Stains are used to a great extent on interior wood work and give a beautiful finish. There are five different kinds of stains on the market, viz., water, spirit, acid, oil and varnish stains.

Water Stains are generally made by dissolving a water soluble aniline dye, or suitable wood coloring extract in water and then adding a binder, such as glue, gum arabic, casein, or borax-shellac solution. The old-fashioned water stains were made by mixing the transparent pigments with stale beer.

Spirit Stains, especially the modern ones, are made by dissolving the spirit soluble aniline dyes in wood or denatured alcohol. They are occasionally cheapened by diluting with benzole, or with water. Some of the dyes require a binder, in which case a small quantity of resin, shellac, sandarach, or Manila gum is dissolved in the alcohol.

Acid Stains are made entirely from chemical liquids and salts. The liquids generally used are acetic, muriatic, nitric, oxalic and sulphuric acids, also ammonia and solutions of potash and soda. The principal salts are bichromate of potash or soda, copperas or sulphate of iron, blue vitriol or

(Continued on page 31).

Modern Gas Appliances For The Home

By GEORGE W. ALLEN
Advertising Manager, The Consumers' Gas Company of Toronto

"GAS LIGHTING"

Much has been said and written about the great Falls of Niagara, with its enormous power resources, and what it would shortly accomplish by way of bringing cheap power to the manufacturer, and cheaper light and fuel into the homes of the people, especially the great middle class.

For the past few years the newspapers and magazines have contained news items in reference to some new use for electricity. Being one of the latter day wonders, electricity has certainly held the attention of the masses; and the public have been waiting patiently for the great day when gas for lighting purposes would be a thing of the past. Electric lighting would be the order of the day. The workingman would be able to have all the fuel and lighting that his modest home required, and at a greatly reduced rate; all by the turn of a button. The public, therefore, cannot be blamed for believing what they hear on every side, because what occupies their attention from day to day must certainly carry with it the idea that electricity is the thing to have.

Reports have gone out far and wide that gas lighting is doomed. The invention of the incandescent electric lamp by Thos. A. Edison, and its first commercial use in 1880 instilled a new idea into the public mind. Gas had been in use for a long time previous, so that the people were ready to receive anything new. This new carbon filament lamp was to take the place of gas. A turn of a switch, when presto! a flood of light was on the scene.

One of the New Style Art Glass Chain Domes for use with gas. Has all the effects of the latest electrical fixtures. It gives a light of nearly 100 candle power for about one-third of a cent per hour.

But amid all the confusion, the gas men have been steadily improving gas lighting conditions. About the same time that Edison was working on his new lamp, Dr. Carl Auer von Welsbach began his experiments with the rare earths that were eventually to lead him to the discovery of the Auer Welsbach upright mantle.

But about the year 1900 we find interest centered in a new gas mantle—the inverted type, and from that time practically dates the commercial beginning of this newest revolution in the science of illumination.

The electric interests have tried their best to combat against the gas mantle, but as fast as a new electric improvement came on the scene, so fast also were inventors bringing on new gas appliances, until to-day, we see the Tungsten electric lamp fighting hard to compete with the newer forms of gas lamps. The Tungsten electric lamp gives about two-thirds more candle-power than the old carbon electric lamp, which it is replacing, and at no increase in power consumption. It therefore is a fair boon to the electric interests; yet when the various lighting devices are reduced to a uniform standard, it will be found that the incandescent mantle gas lamp yields a greater available candle-power for a unit of cost than any of the other systems.

Germany—the greatest centre of alternating current electric machinery in the world, and where scientists, a few years ago, claimed gas was doomed and the electrical power was to take its place—has of late been made to confess that gas cannot be equalled as a superior illuminant, cost for cost. Several German towns have discarded electric street lighting entirely and have installed the newer form of high pressure modern gas lighting.

The inverted gas mantle light stands to-day as the highest type of satisfactory illumination, and yet at a cost that proves it the most economical.

Gas fixtures can be had in nearly every style and design. Chain dome effects, high ceiling effects; and in every style imaginable.

Architects, builders, and contractors, and home-owners are beginning to realize that gas light piping should be installed in every home.

Combination fixtures should be the order of the day. Because houses, containing both forms of illumination, are ready sellers, and renters, and are more modern in every way.

Sheet Metal as a Roofing Material

The Advantages and Use of Sheet Metal, Especially Metal Shingles as a High-Grade Roofing—Proper Methods of Framing

No money spent on a house will add more to its selling value than that expended in taste and material on the roof. The roof is the first thing seen, and first impressions are most lasting.

Poor roofing is expensive at any price, as the damage that results from its use often amounts to more than the cost of a half-dozen good roofs. So, good roofing is a consideration of the highest importance to every builder and property owner.

There have been so many different kinds of roofing material offered the public in recent years—many of which proved unworthy of the name—that the average man is apt to listen with incredulity to recommendations of the merits and quality of any roofing that is proposed to him.

It should be remembered, however, that primarily the duty of a roof is to afford shelter and protection from the elements. If a building is erected for temporary purposes only, most anything will do for a roof, but when erecting a barn, church, dwelling, or public building, the owner wants a roof that will not only give the greatest protection, but one that will last as long as the building stands without constantly needing repairs.

Also, looking at the matter in a broader aspect, a roof should be something more than a protection. It should ornament and increase the value of the building.

Few people realize the great effect the appearance of the roof has upon that of the entire structure, and to what extent a good roof adds to its worth.

A roof should be looked upon as an investment, or, rather, as a protection to the investment that is represented by the building and its contents.

It does not take long for a leaky roof to rot the sills and timbers, to injure the walls and cause the plaster to break, and render the building damp and unsanitary. With such a roof, repairs are necessary within a few years, and their cost is not only considerable, but they depreciate the investment.

With these points in mind it is well for builders and owners to consider the merits of the various permanent roofings. We shall, in subsequent numbers of this magazine, discuss the desirability and use of slate and of tile roofings. So now we want to give particular attention to the various styles of sheet metal roofing and shingles. We know that "comparisons are odious," but when you are intending to spend good money for a roof it is advisable to compare the relative merits of the different kinds.

The wooden shingles that are supplied by the lumbermen to-day are very poor roofing, and for permanency and utility are not to be considered. In the old days, when shingles were hand-grooved and sawed, and made from well matured lumber, they performed the service demanded of them and made good roofs. Now they are made by machinery, too often from green, sappy and unseasoned timber; are sold without being assorted, and will not last over three or four years without repair.

While cheaper at the start, the expensive repairs that are necessary to make wooden shingles do anything like the service that is required of a good roof, make their purchase poor economy. Compared with the wooden article, metal shingles, or other metal roofing, will not rot, split, curl up or burn. They are more durable; more easily laid; more ornamental; and will not need constant repair. They are fireproof and reduce the cost of insurance on buildings where they are used—this saving in a few years amounts to considerable. A metal roof is also a protection against lightning—no building so covered has been known to be injured by lightning. Should lightning strike a metal roof, the electricity is scattered and passes off harmlessly into the atmosphere.

An incident related by the *Metal Worker* illustrates well the merits of corrugated roofing as a fire protection. "In a recent fire, consuming the storehouse and barns of one of our subscribers, a building adjacent to a large storage warehouse filled with combustible goods, had a corrugated iron roof laid on over old shingles. There had been an unusually long dry spell, but although long tongues of flame at times seemed to envelop the entire roof, and the heat was so great as to peel the galvanizing off, yet it resisted the fire, and in so doing, stayed the path of the flames which otherwise would have laid in ashes a prosperous business section. The corrugated iron by its very shape maintains an insulated air space between the under side of the iron and the roof, and during a fire in all probability cool air passes from the eaves to the peak, thereby further preventing ignition with the wooden parts of the building. In this respect corrugated iron is far superior to tin, especially for farm buildings and other structures where the cost of frequent painting would not permit of so good a material as tin being used."

The cost of metal shingles, while more than other forms of metal roofing, is less than the first quality of slate, and is as low, and cheaper in some localities than good wooden shingles when their service and permanency are considered. A comparison of the initial expense is not to be accounted because it takes but a few years for the saving they effect in repairs and other ways to greatly outweigh their first cost.

Metal shingles are applied by the same rules that govern the laying of wooden shingles or slate. The roof should be covered with sheathing boards laid with tight joints. Good common boards will answer, but they should be of even thickness. Sheathing boards should be laid either parallel with the ridge and eaves or diagonally—never lay sheathing boards up and down.

The use of sheathing paper with any form of metal roofing is recommended. Being a non-conductor, it adds much to the warmth of the house in winter, makes the house cooler in hot weather, and adds but little to the cost of the roof. Tarred paper, however, should never be used under metal roofing; the acid in the tar injures the metal.

In flashing against a side wall bend shingles or flashing strips so that they project up the side of the wall three inches or more, and counter-flash down to within one inch of the roof line. These directions apply also to dormers, chimneys, skylights, etc.

Judgment Needed in Installing Furnaces

A Good Furnace Improperly Installed Injures the House and is Unfair to the Manufacturer

The successful installation of a furnace depends upon the proper exercise of judgment. The builder should therefore, see that the dealer who handles this work has a competent staff of men to see to the work of installation, so that his tenant will eventually be satisfied with the results.

A good furnace may prove very inefficient if not advantageously located. Nothing is more trying on the temper than a furnace which requires constant attention, or which burns up coal at an alarming rate of consumption. The tenant who finds that his furnace does not work as it should, will in every case make the subject one for discussion everywhere, and the house and the makers, who supplied it, will be severely criticized wherever that man goes.

Each contract presents features all its own. Judgment is required to decide on the proper size and location of the furnace, the registers and the conductor pipes in every instance. Many things have to be considered—the construction and exposure of the building, prevalent climatic conditions, the plan of the rooms to be heated, etc. An error of judgment may mean an unsatisfactory heating system, and, as a natural sequence, the perpetuation of a tangible reason why orders should not be repeated. The memory of such mistakes rankles in the minds of tenants as long as the furnace lasts, and may be the means of turning hundreds of dollars' worth of work from the manufacturers who supplied it.

By the employment of reasonably competent men, however, serious mistakes can be avoided. It is not a difficult matter for experienced workmen to determine the best way of installing a furnace—provided that proper attention is given. A prime consideration is, of course, to install a heater sufficiently large to properly warm the house. Pennpwise landlords will sometimes place economy before comfort, and want to put in a furnace too small for the house intended. A wise dealer will protest firmly against any such course. It would sometimes pay to refuse orders of that description, as the furnace is certain to cause dissatisfaction, and it is on the dealer that the blame will recoil. In practically all cases, a size larger than is judged to be absolutely necessary, should be recommended. It will prove more economical, durable and satisfactory. A heater of not sufficient size is bound to be a heavy consumer. The householder must keep the rooms warm and will endeavor to create comfort by loading the furnace up and letting it rip. His coal consumption will exceed that of a larger furnace, and the life of the heater will be shortened.

SOME PRIME CONSIDERATIONS.

An American furnace manufacturing company issues a list of directions for setting and piping, including the following:

"The furnace should be placed as nearly central to the rooms to be heated as possible, favoring that direction from which the prevailing winds blow. In setting the castings, see that they are perfectly level on foundation, and that faces of the mouthpiece of both ash pit and feed section, dome, or that of radiator, as the case may be, are plumb, so that the door shield will properly fit against them. Mix dry cement with water to the thickness of mortar. Thoroughly cement all joints with this, excepting flanges on door shields; on these use asbestos cement. Spread this carefully around shield flanges and also in cup joint where shields join, then place shields in position and draw them up tightly and evenly with bolts. See that smoke pipe fits tightly over smoke pipe collar, and do not allow it to project into chimney flue. Before connecting smoke pipe with chimney, see that there is a good draft and that the flue is clear of obstructions, such as brick, mortar or soot. Carefully line with tin all woodwork in close proximity to smoke-pipe, leaving space for circulation of air around it.

MAKE PIPES SHORT.

"Locate registers in such parts of room as will make the air conducting pipe short, of nearly equal length, and distribute them around hood of furnace as evenly as possible.

"The warm air pipes in basement should be straight, and have all the elevation possible (not less than one inch to one foot). If necessary to make turns, avoid all sharp angles. The only power that conducts air through the pipes is that caused by the tendency of heated air to rise; avoid horizontal and crooked pipes. Protect all warm air pipes from cold air currents, because these will chill the pipes and stop the circulation of air within. Pipes exposed to cold currents, or where they pass through cold rooms in basement, should be made double, or wrapped with air cell asbestos paper. Provide all warm air pipes with dampers close to the furnace.

"Without particulars, no reliable rule can be given as to size of pipes required in conducting the warm air from the furnace to various rooms. The judgment of the mechanic doing the work must decide in this respect."

THE IMPORTANCE OF THE CHIMNEY.

Remember that the successful working of the furnace depends largely on the chimney. The furnace smoke flue should be a separate one, with no other openings or connections, straight as possible, of same area from top to bottom, extending several feet above the highest point of roof, and provided with an ash pit door below the smoke pipe opening. We recommend that the furnace smoke flue be not less than 8x12 inches inside measurement. However, an 8x8 inch flue with a good draft may answer for heaters with 8-inch or smaller smoke pipe. No smoke flue should be less than 8 inches in depth. Long, narrow flues, such as 4x12 or 4x16 inches, are no good.

Fire-Proof Concrete Houses

In a paper read before the American Society of Mechanical Engineers, F. B. Gilbreth, the well-known contractor, discussed the subject of fire-proof concrete houses, and from what he had to say the following extracts will doubtless prove interesting:

"In concrete structure there need be little or no combustible material. Let us take, for example, the dwelling house, for it is the most difficult to make both cheap and fire-proof. In a concrete residence there is little trim that cannot be made better and cheaper of Portland cement than of wood. The chair rails and picture molding can be made of concrete. The trim around the windows and doors can be molded in metal molds as cheaply as straight members. Even the wire mouldings can be done away with, and the conduits buried in the concrete partitions, walls, ceilings and floors. Base-boards should be made of concrete or else omitted entirely, as they serve no useful purpose in a concrete building, except in following wooden precedents. Windows may have cement sashes, with wired glass and self-closing shutters, or self-dropping shutters of rolled-up metal or asbestos. Metal furniture may be used. The paint and varnish used on buildings and furniture should be selected carefully, as these are great factors in determining the temperature at which a fire will start and the speed with which it will spread. There is also a great difference in the paints and varnish used for painting concrete. The flooring need not be of wood. There are many first-class non-combustible materials besides Portland cement that will fill every good requirement of wood and still be fire-proof. There are also parquetry floorings, made of slow-burning wood and much thinner than the old-fashioned hardwood floor, which make the best flooring in case wooden floors are desired. In a concrete residence there is no excuse for wooden under-flooring nor for wooden screeds.

Foundations and Drainage

The unsightly cracks which mar the appearance of so many new houses could be easily obviated if more attention were given to the foundations of the building at the time of construction as to proper drainage.

The kind of foundation which may be used for any particular building depends partly upon the nature of the building and also partly upon the character of the soil or the site upon which it is built.

We might classify soils as wet or porous, and dry or solid; but again we may divide the sites into two classes; those which can well be drained and those which cannot.

For even though the soil be firm and dry, we should not expect to do much excavating or erect much of a building without making some provision for draining away the water, which may be expected to be present at times, provided, of course, that such drainage is practicable.

And on the other hand, we may have to deal with a wet porous soil and a site where there is a quantity of water; yet it may be that by well arranged drains, this can be made an excellent building site.

In draining a building site the main points are to get drains sufficiently deep, have enough of them and have them connected to an outlet of ample size and with a good fall.

When we attempt to construct cellars or basements in soil which is wet or on sites where, for any reason, drainage is impracticable, we must plan to make such construction waterproof. This is not a difficult matter provided we are not unduly scrimping as to the expenses.

A few inches, more or less, of good concrete with which some water-proofing is combined, is generally sufficient. In some cases asphalt and felt are used.

Mission Oak and Early English Finish

The prevailing fashions in furniture and trimmings have had in recent years a marked influence on the styles of finishing the interior trim in houses. The early English and the mission oak being particularly in demand.

There is no standard for mission oak or mission finish,. The following may be taken as a satisfactory method of treating yellow pine for producing the desired result. Yellow pine with its sap does not take stain like oak or even chestnut and its bold, coarse grain does not take well in imitation of mission finish, but if something similar must be produced in this wood we would suggest proceeding as follows: Make stain by mixing two pounds best drop black, in oil, and one ounce rose pink, in oil, with about one pint best brown japan, thinning with two pints of turpentine or benzine, straining the mass through fine cheese-cloth to eliminate lumps. Apply with brush, and if it does dry out strong or deep enough apply the second coat after it is thoroughly dry. Mission oak is not usually finished in high gloss, but left dull and a method most favored is to give it the appearance of a rubbed surface by giving a coat of flatting varnish over stain.

For quick work use drop black and rose pink ground in japan in the same proportions as noted above, beat up the colors, in, say, one gill of coach varnish, and thin with turpentine, not benzine.

For graining colors of early English and weathered oak the ground should be a very dark grey or lead color. The grain color is made of pure yellow ocher or sienna and raw umber with a dash of chrome green. Mix some whiting with the oil colors to keep it from running together when it is combed. It is no doubt known that japan is necessary to make graining color dry, and that oil must not be used, thinning being done with turpentine. Put in the grains, lights, etc., as you would over light or dark oak. If desirable, glaze with asphaltum that has been dissolved in turpentine, and to which a little boiled oil has been added to keep the glaze from setting too quickly.

The ground for weathered oak is burnt umber, to which a little black may be added if desirable. Have the ground coat dried with egg-shell gloss only, and when dry and hard rub it over with whiskey or alcohol, if the weather be cold, while in moderate temperature stale ale or beer will keep the grain color from creeping. The graining must be done in distemper, so as to produce the flat effect of weathered oak. Vandyke brown, ground in water and mixed with stale ale

Paints For Interior Wood Work

(Continued from page 26.)

sulphate of copper, verdigris or acetate of copper, nitrate of iron, nickel chloride, silver nitrate, etc., in conjunction with logwood, fustic, nut-galls, etc. They are very lasting, but somewhat expensive, as it takes an expert to make or apply them.

Oil Stains are prepared in several different ways. The more ancient method was to thin a transparent pigment, ground in oil, with turpentine and add a binder in the shape of a liquid japan drier. They were simple, but more permanent than many of the modern oil stains. The modern method consists of dissolving the oil-soluble aniline in oil, benzole, or dead oil and reducing with oil, turpentine, benzine, etc., adding a drier.

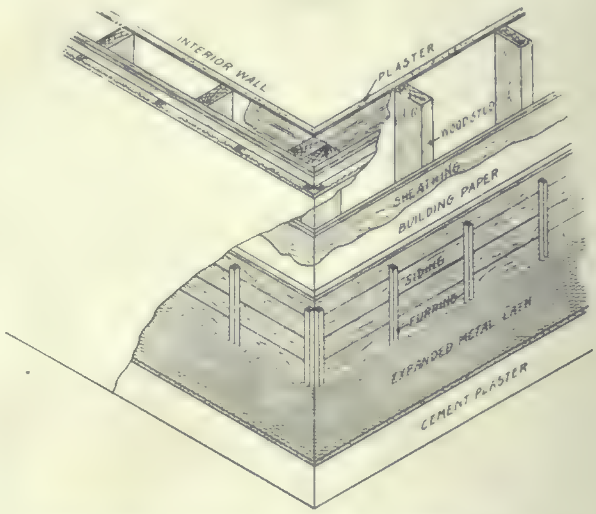
Varnish Stains are somewhat of a recent innovation, and are usually made by dissolving the cerasine colors, *i.e.*, wax-aniline dyes, in a small quantity of varnish at a temperature of 100 deg. to 175 deg. F., then diluting with more varnish, turpentine, dead oil, solvent, naphtha, etc. The yellow, orange, and some of the brown aniline dyes are very fast to light, but most of the blues, red, violet, and green dyes fade quite quickly in the sunlight.

Shingle Stains, as a rule, are made by mixing pigments ground in oil with a very little linseed oil, some creosote or "heavy oil," occasionally some paraffin oil, enough japan to make them dry, and finally thinning with turpentine, benzine, kerosene, or dead oil. Like varnish, the quality will depend entirely upon the price.

The above is a portion of a paper read at the recent Illinois State Master Painters' and Decorators' Convention. The first part of the article has to do with exterior painting.

Metal and Wooden Forms in Concrete Construction

In considering the cost of construction as a whole it is likely to be governed by the cost of the forms as the cost of the concrete. For illustration, in the cost of columns, although they are made so as to be reduced in size as easily as possible, this is somewhat expensive in labor, and after they are reduced the girders and beams which meet at a column are too short, and have to be spliced out, which adds to the cost, and these costs are likely to exceed that which can be saved in concrete. It is, therefore, more economical to run the columns one size through the full height of a low building, or to reduce the size only twice, or at most three times, in the height of a high building. For instance, the actual cost of labor (without regard to wastage of lumber) in reducing columns from 16-inch to 12-inch on a certain job amounted to $5.70, whereas the cost of the concrete saved by the reduction was $2.30. A set of plans in pamphlet form has been compiled for standard forms for all kinds of work, and where special framing is required plans are made for these special cases, and in spite of this care and study the above figures represent actual experience. Therefore, in designing and handling form work the cost of labor is the principal item to be considered. The opinion was expressed that the forms could be cheapened by the use of common and rough lumber instead of a fairly good grade of dressed lumber. The fact that it is almost universal to use a good grade of dressed stock would seem to disprove the above statement. The cost of dressing varies according to the mill from $1.50 to $4 per thousand feet for planing four sides. The price of second grade hemlock and spruce differs but little from that which has small, sound knots and is free from wind-shakes or large season cracks, and such lumber works so much easier as to cut down the labor cost more than the equivalent of the difference in cost of material. Some builders use ⅞-inch stock, others 1½-inch, and some 2 inches thick. The thicker lumber will stand the wear and tear longer than the light, and can, therefore, be used so many more times than the thin that it is more economical in the long run if the work in hand is large enough, so that the forms can be used several times without delaying the rapid progress of the work. With planed stock tighter joints can be obtained between boards, which prevents leakage of the fine materials and weakening and roughening the surface, and the boards are of even thickness, so that a fairly good surface is obtained, which needs little treatment after the forms are removed except where an ornamental appearance is especially desired. If rough lumber is used, in order to get even a passable surface finish considerable labor must be spent upon dressing the concrete after the forms are removed, and this must be done by mechanics. If a cement finisher, who is in no sense a plasterer is used, and his wages are 30 or 45 cents an hour, only a fair job can be obtained. If plasterers are used, their pay is 50 or 60 cents per hour, and the job is properly finished, but in either case the cost is greater than the cost of planing lumber and of using a good quality.



Detail showing application of metal lath in stucco work.

Metal forms for building work have so far been more or less unsatisfactory for various reasons. The march of invention will certainly make this ideal method entirely practicable in the near future.

The "Chicago Rules" of Measurement of Excavation and Concrete Work

In view of the extent to which concrete is now being used in foundation work and general buidling construction, the following rules of measurement, which have been adopted by the Chicago Contractors and Masons' Association, the Chicago Architects' Business Association and the Western Society of Engineers, cannot fail to prove of interest:

Excavation of Cellars and Basements.

1. Excavation to be measured and computed by the actual amount of material displaced. If unit price is based upon loose measurement, add forty (40%) per cent. to actual bank measurement, except if consisting of sand and gravel, when only twenty (20%) per cent. will be added. If rehandling becomes necessary, same to be done at a special price agreed upon in addition to the above.

Excavation of Trenches and Pits.

2. Excavation of trenches, pier holes, or pits when more than 3 feet wide to be computed on actual contents when less than 5 feet deep.

When less than 3 feet wide excavation of trenches, pier holes or pits to be computed on actual contents if less than 2 feet deep.

If more than 2 feet deep, compute contents of trench on basis of 3-ft. width, even though same is narrower.

If less than 2 feet in depth, estimate actual width.

For pits and pier holes more than 2 feet deep and less than 12 square feet in area estimate area of same on base of 12 square feet multiplied by depth of same down to 5 feet, and no more than 5 feet deep, estimate on same basis as given below for additional depth of trenches, with the same percentage of increase added.

Add 75 per cent. to actual contents of excavation of trenches, pier holes or pits for depth between 5 feet to 10 feet.

Add 150 per cent. to actual contents of excavation of trenches, pier holes or pits, for depth between 10 feet and 15 feet.

Add 225 per cent. to actual contents of excavation of trenches, pier holes or pits for depth between 15 feet and 20 feet.

Add 300 per cent. to actual contents of excavation of trenches, pier holes or pits for depth between 20 feet and 25 feet.

Add 375 per cent. to actual contents of excavation of trenches, pier holes or pits between 25 and 30 feet in depth.

Add 450 per cent. to actual contents of excavation of trenches, pier holes or pits between 25 and 30 feet in depth, and so on, adding 75 per cent. accumulative for every 5 feet additional depth.

Back Filling and Grading.

3. Soil required for back filling or grading to be measured by computing from cross-sectioning cubic contents of area to be filled or graded.

4. Sheet piling and lagging to be estimated per thousand feet of lumber required. Kind of lumber to be specified.

5. Shortage of earth banks to be done at unit price, per square foot of shored surface of bank.

6. Pumping or bailing when required to be done at special price, in addition to excavation unit price, as the excavation rules are based on dry work; this, however, does not apply to rain or storm water.

Concrete Foundations.

7. Foundations for walls to be measured actual contents when made with square and level set-offs.

Footings with sloping or beveled off-sets less than 30 per cent. from the horizontal multiply area of base by greatest height of footing. This applies to piers also, except when courses in pier foundations are less than 12 feet in area, when 1 cubic foot will be added for each corner for every foot in height of such course.

8. Foundations for all projections, such as chimney, breasts plasters, buttresses, or flues, connected with walls to be measured actual contents contained therein, and 1 cubic foot added thereto for each corner for every foot in height.

9. Recesses and slots in foundations to be measured solid and in addition thereto allow two (2) cubic feet for every four in height or length.

10. Arches in foundation. Multiply length of chord at spring arch by height from chord to extrados by thickness of arch, and add to the wall measurement. Height of arch ring equal to thickness of wall.

11. Circular or polygon foundations to be figured at double actual contents.

12. For wall 14 feet or less in height, 24 inches or more in thickness, use the actual thickness as basis computing the volume. For walls less than 24 inches in thickness, add one-half the difference between the actual thickness and 24 inches in computing the volume. If walls are more than 14 feet in height between doors, add to cubic contents fifteen (15) per cent. for every additional 4 feet in height, on accumulative scale, as given for trench excavation.

13. For circular walls of radius sufficiently large to obviate the necessity of using specially prepared lumber for forms, add one-fifth of length to girt wall, and figure cubic contents on the same basis, as prescribed for external and division walls, paragraph 12.

14. For battered or sloping walls, estimate contents on same basis as for external and division walls, and add one-half of contents of wedge, or batter to same when narrower on top than 24 inches. See paragraph 12 and 17.

Intersection and division walls, 24 inches thick or less (bonded together in any manner not abutting), to be measured as slot or recess. When thicker, add 1 foot to length of wall for every intersection when measuring.

15. In retaining walls, reinforced with beams, columns or girders, figure concrete casing a minimum thickness of 12 inches from outside edge of steel on side next to earth bank and 6 inches from outside edge of steel on opposite side—i.e., compute wall 1 ft. 6 in. thicker than width of steel.

For all other retaining walls, compute on same basis as for external walls, paragraphs 12 and 17.

No deduction in cubic contents of concrete to be made for metal imbedded in same.

16. Hollow walls to be at special rates.

17. For each corner of wall more or less than 90 deg., add 1 ft. 6 in. to girth length of walls in measuring.

The term corner is used for salient angles of walls, and angle for re-entering angels.

18. All plain projections, such as chimney breasts, piers connected with walls and pilasters, to be measured actual contents contained therein, and 1 cubic foot added for each corner for every foot in height.

19. Independent plain square piers to be measured by same rule, i.e., add 1 cubic foot for each corner for every foot in height. For plain polygon or round piers, add 4 cubic feet for each foot in height.

20. Recesses and slots to be measured solid in addition thereto allow 2 cubic feet for every foot in height or length.

21. In vaults, multiply length of chord at spring of arch by height from chord to extrados by thickness of arch.

In walls, find contents of arch by same rule and add same to wall measurement, as called for in paragraph 10.

In sewers and tunnel arches, multiply length of extrados by thickness of arch.

Openings with Frames Built In.

22. Deduct contents of windows, doors, and other openings, mesauring from jamb to jamb and from top of sill to spring of arch, and add 2 feet of wall for each jamb for every foot in height of opening when plank frames are used; if box frames are used, add 4 feet of wall for each jamb for every foot in height.

Openings Without Frames.

23. Deduct contents of openings, same to be measured from top of sill to spring of arch and shortest distance between concrete jamb for width ,and add for each jamb 2 feet of wall for every foot in height of opening.

Circular, oval or other special shaped openings to be figured at special price.

Chimney Breasts, Flues and Pilasters.

24. All flues or hollow in chimneys or walls less than 2 feet in area figure solid and add 2 cubic feet for every foot in height. All flues and hollows in chimneys or walls from 2 feet to 4 feet in area to be measured solid. When larger, deduct one-half of contents of flue.

Detached portions of chimneys in buildings and plain chimney tops above roof to be measured solid, and 1 cubic foot to be added for each corner for every foot in height.

25. Detached chimney stacks to be figured at special rates.

26. No deduction allowed for omissions of concrete for cut stone, terra cotta or other trimmings, bond blocks, timber, joists or lintels.

All ornamental or moulded work in cornices, gutters, belt or sill courses, etc., to be figured at special rates.

27. Cutting and patching of joists, girder, or other holes, slots, panels, recesses, etc., to be paid for on basis of time and material required.

28. When ordered by owner, architect, engineer or the superintendent in charge of the work, to rack or block in consequence of delay of delivery of iron, steel, stone, terra cotta, or other material, that concrete work may connect with such racking or blocking shall be measured as extra work, as follows: Increase girt length of such line by one-half and multiply by thickness of the wall.

Concrete Floors on Soil and Tile Arches.

29. Floors to be measured by the superficial surface between outside walls of building. No deductions to be made for floor sleeps, conduits, pipes, drains, division or partition walls. No deduction to be made for any piers, columns, chimney breasts, pilasters or other projections of walls of 10 feet or less in area.

Caissons.

30. Owing to grillage in caissons being left at different heights in same building, unit price for caissons will be computed on excavated contents, including necessary wood-lagging and rings for same. Cubic contents of excavation of caissons to be computed from top of first set of lagging to bottoms of caissons and from outside of lagging. If steel or any other special casing is required, same to be paid for additional at special unit price per pound.

31. Area of bottom of bell to be multiplied by height of bell to neck for cubic contents.

32. For cassions 7 feet or more in diameter, estimate actual contents from outside to outside of lagging.

For caissons from 7 to 6 ft. 6 in., inclusive, add 5 per cent. to actual contents.

For caissons under 6 ft, 6 in., to 6ft. inclusive, add 15 per cent. to actual contents.

For caissons under 6 ft. to 5 ft. 6 in., inclusive, add 25 per cent. to actual contents.

For caissons under 5 ft. 6 in. to 5 ft., inclusive, add 35 per cent. to actual contents

For caissons under 5 ft., add 50 per cent. to actual contents.

33: If compressed air is required, same to be paid for in addition to the above. .

34. If rings are ordered left in caissons, same to be paid for additional at unit prices per pound.

35. Pumping and bulkheading to be paid for at additional price.

36. No deduction to be made for cubic contents of metal imbedded in concrete.

Concrete for filling of caissons to be computed on actual contents per cubic foot of concrete, but no deduction to be made for any metal imbedded in same.

Reinforced Concrete Work.

37. Reinforced walls: Compute concrete on same basis as specified in sections 12 and 17 for external and division walls, and add to same cost of reinforcing metal put in place. If through changes or revisions cutting of reinforcing metal delivered or ordered becomes necessary, estimate the full length of such bars or metal fabric, and add to same cost of cutting and fitting required. Reinforcing metal to be computed on unit price per pound or square foot. No deductions to be made in estimating cubic contents of concrete for any metal imbedded in same, such as wire netting, expanded metal bars, beams, columns, etc.

Columns.

38. Measuring of plain uniform size column to be covered by the foregoing paragraph 19 relating to piers.

39. Capitals, cap, brackets, panels, moulding or other ornamental or moulded work to be figured special rate.

Girder, Floor Beams or Other Drop Projections Below Floor Slab.

40. For projections named in this paragraph, add for each corner and angle to cubic contents 1 cubic foot for

each foot in length. For each chamfered or rounded corner or angle add ½ cu. ft. for each foot in length in addition to the above.

41. Floor and roof slabs to be estimated on same basis as called for in paragraph 29 for floors on soil, and at a minimum thickness of 6 inches. Less than 6 inches in thickness will be computed as 6 inches.

42. No deductions to be made in floor area for opening of less than 20 square feet. For larger openings, after deducting full area of opening, add one superficial foot to floor area for each foot in length of girt of opening, and 1 cubic foot extra for each corner or angle.

43. For pits, baskets or other depressions in floor, add one superficial foot to the area of walls and floor of same for each foot in length of each corner and angle.

44. Setting of fabrics, frames, pipes, sleeves, bolts, rods, clamps, etc., imbedded in concrete to be paid for additional at special price.

FLOOR BASE AND COVES.

45. Floor base and coves to be estimated at special price per lineal foot, with 1 foot added to length of same for each corner and angle. For base or cove around round columns, estimate three times girt of column, and for square or polygon columns, add 1 foot for each corner to girt of same.

46. Concrete stairs to be estimated square foot area of face of treads and risers. Stair landings and platforms between floors to be same unit price per foot as stairs.

47. Curbs and roofs of skylights to be estimated on same basis as called for in sections 40 and 41, except that quantities for same shall be doubled.

48. Sidewalks laid on soil of tile brick arches to be estimated same as floor slab, section 29, with special unit price.

Discussion of the Foregoing Rules

It is to be regretted that such a commendable and serious endeavor to formulate rules to govern the methods of measuring excavation and concrete work for unit price contracts by the joint committee of the Western Society of Engineers, the Chicago Architects' Business Association, and the Masons' and Contractors' Association, should have resulted in the production of a set of rules which are seemingly based on a wrong conception of the various, distinct, and separate labors which go to make up the cost of concrete work.

According to the practice of the Aberthaw Construction Company, of Boston, Mass., in making up their estimates, the fundamental law of measurement is, that all quantities of materials and labor should be measured net as finally left in the building or structure, and that all extra labors, waste, etc., should be allowed for in price and not in measurement. All work of temporary character should not be measured unless it forms a distinct labor item which can be separately measured, for example, staging for brick masons, or painters, sheeting for trenches, etc., should not be measured separately, but should be included in the unit price of brick work, painting or excavation. On the other hand forms for concrete should be measured separately, because they are a separate and distinct operation of labor necessary to the construction of concrete work, and similarly painting on structural steel should be measured separately and not included in the price per ton.

The committee has disregarded the cost of placing concrete in thin walls and floors, and has also endeavored to eliminate all measurement of forms to concrete work, allowing an excess measurement of concrete to pay for both. There are a number of difficulties in the way of paying for forms for concrete work at unit prices, among them being the fact that they will not be seen when the building is finished, and furthermore, that there is no established unit of measure for forms. For example, an extravagant use of lumber is apt to result if board feet of lumber are designated as the unit for basing prices. The most logical method seems to be to base estimates for form work on the square foot of concrete surface in contact with forms. This does give a definite and unchanging unit, as there will always be the same number of square feet to centre in the under side of a floor, and the sides of a beam, although the lumber used on similar work by different contractors may vary. Much here depends on the design of the forms used.

To show how erratic the application of these rules to concrete work might be, let us take an actual instance of their working. Assume two walls, one 6 inches and one 12 inches thick, with a unit price of 30 cents per cubic foot. The rules would allow 1¼ cubic feet of concrete per square foot for the 6-inch wall, and 1½ cubic feet for the 12-inch wall. Assuming the actual cost of concrete without forms to be 25 cents per cubic foot, this would leave 25 cents in the first case, and 20 cents in the second case, for form work to the two sides, although the work is the same in both cases. Again, if a richer mix were adopted for another 6-inch wall, and the unit price raised to 35 cents, we should get 28¾ cents left for forms, the same forms as those paid for at 25 cents and 20 cents in the other walls. It appears that the fundamental error is the effort to adjust quantities rather than prices. On municipal work especially, adjusting quantities as a basis of measurement might bring the contractor or others into embarrassing situations, for it would be practically impossible to make an untechnical investigating committee see the justice in, for example, charging for 70 cubic feet of concrete in a column containing only 10 cubic feet. Undoubtedly the efforts of this committee are a step in the right direction, and certain standard methods should be adopted for measurements. It is also too much to expect that on the first trial a perfectly equitable and satisfactory set of rules could be framed. A proper discussion through the press or otherwise of the pros and cons of these rules should greatly facilitate the making of a final set of rules fair and equitable to owner, engineer and contractor.

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Editorial Notes

This is the first issue of our new journal. We wish to make it the very best of its kind in America. We want to make it most helpful to our subscribers and will appreciate hearing from any who have any suggestions to offer.

* * *

The first subscriber was Alex. Harvey, builder, 804 Talbot Street, London, Ontario. He will be the leader of a subscription list of thousands before the year is out.

* * *

L. A. DeLaplante Co., Limited, the very first company called on, were easily convinced that the people we are going to reach are all prospective customers, and that if advertising has any value THE BUILDER AND CONTRACTOR should produce the results. We recommend our readers to consider our advertisers when buying.

* * *

Take it from us that the builder who does not attend the Canadian Cement and Concrete Exhibition at the St. Lawrence Arena, will make a serious mistake.

* * *

Conditions have undergone radical changes in the past few years. Building operations are now carried on with a definite ideal always in view. The contractor must see ahead of him, and note the possibilities that these changes have made in his work. There has been a revision in the code of ethics of the building world, and the number of builders' working days has been considerably lengthened so that there is really no great amount of time in the year that there is not some kind of labor for him to perform, provided he is wide awake enough to note it.

* * *

There are newer materials being placed on the market continually, and while many of these are meritorious, there are some that will not bear very close inspection. If the builder has not been noting these things, then he has been at fault, and his opinion and knowledge of their value is of little good in time of action. If a man fails to improve himself when he has time on his hands, who can be blamed but himself? Failure in looking ahead is one of the pitfalls of a number of building operators. If you are content with what you already know, then you may hope to remain in the class that stands still, and only does things by halves, while others who have seen the importance of improving their conditions continue to advance to higher pinnacles of success.

* * *

There is no reason why the modern builder should not have ideas of his own that are of a certain value to himself and to others. The avenues are open to you and everyone is looking for an improved condition. Be a thinking man, and not merely a tool such as you employ in your labors which acts only at your command, and has no power to think for itself. If you are in earnest, there will always be ample reason for your greater success, and there will then be a profitable pleasure in your labors that now seem to have reached their limit.

* * *

The prevention of the growth of "Shacktowns," and poorly laid-out settlements, just outside large cities is the purpose of a bill introduced in the Legislature by Mr. W. D. McPherson, member for West Toronto. The bill is similar to the one introduced recently by Mr. Allan Studholme on behalf of the city of Hamilton.

It provides that every plan or survey of lands lying within five miles of the boundaries of a city of 50,000 or over shall, before registration, be filed with the Ontario Railway and Municipal Board. A copy of the plans must be supplied to the city interested, and if objection is taken as to the direction, location or width of streets, in view of the probable expansion of the city and the desirability of securing connected thoroughfares, such objections may be laid before the board, which is given power to order changes in the plans.

The Hamilton bill aims to give the city the right of supervision that Mr. McPherson's bill entrusts to the Ontario Railway Board. It also names two miles instead of five as the territory in which the city has the right of interesting itself.

* * *

The reputation of Toronto as one of the most beautiful cities in America is largely due to its architectural activities. Some of the best work in the city, especially in the residential districts, has been conceived by the younger members of the profession who are prepared to spend more time and thought for the client, in working out original ideas, than many of the older architects. Although Mr. J. H. Self, of 436 Yonge Street, has only been established about a year and a half, yet he has been entrusted with the preparation of plans and the superintendence of several handsome homes in the best residential parts of the city, an apartment house on Indian Road, a town hall at Beaverton, and a re-inforced concrete warehouse on Oxford Street. He has the advantage of having taken a course in architecture at the School of Science connected with University of Toronto, as well as at other architectural schools. He is a practical man, having worked for several well known architects and the Trussed Concrete Steel Co.

The excellent home described in this issue may be considered a good example of his work.

* * *

The members of the Montreal Board of Control recently expressed themselves as in favor of the granting of a petition submitted by T. A. Trenholme, ex-mayor of Notre Dame de Grace, relative to the maintaining of certain building restrictions in the districts 1,000 feet on either side of Sherbrooke street, in Notre Dame de Grace ward. The matter on recommendation of the board, will be submitted to the legislation committee for consideration and clauses embodying the requirements, as expressed in Mr. Trenholme's communication will be inserted in the city building by-laws.

The request submitted was to the effect that the building restrictions for the district named, as sanctioned by the council of the defunct municipality of Notre Dame de Grace, should be maintained. Mr. Trenholme, in the course of his letter to the board, stated that Notre Dame de Grace, in making these restrictions had been guided by the best regulations in the building by-law line in all Canadian municipalities. According to the regulations in question, all the district was to be forever reserved as a purely residential one. All houses were to be built at least fifteen feet back from the street line, whilst a space of ten feet on either side of each residence was to be obligatory. As to the class of structures permitted in the section, it was specified that no building should be erected which did not have a window in every room, whilst the character of each and every structure was to be purely residential. The materials to be used were brick, stone or concrete. Wooden structures were permitted, but only on the understanding that they were to be situated at a distance of at least twenty feet from all other buildings.

New York, distinguished for having the worst housing conditions in the world, but long the leader in housing reform in America, continues the leadership. Her 7,000 privies are now a thing of the past, and her 100,000 windowless bedrooms are fast disappearing.

* * *

The outlook for the future is hopeful. The old idea that the housing problem could be solved by building a "model tenement" is fast disappearing. In its place, one finds emphasis laid upon housing laws which will control the situation for all time; on efficient and vigilant sanitary inspection; on garden cities and model small houses in place of huge tenements; on instructive visitation of our immigrant population, and the teaching of the elements of hygiene in the public schools and in the home.

* * *

The remedy for squalor is education. Law will help some. A law, rigidly enforced, that will prohibit owners from maintaining houses under a certain condition, will of course remove the chances of their being rented. But even when such laws are in force it is hard to keep such places in good condition after the tenants move in. This has been shown in Gary, the model steel city of Indiana, where model tenements and cottages were rented to foreigners who immediately turned the bath tubs into coal bins, the deep sinks into garbage boxes, and never turned on the water provided for flushing the concrete floors.

* * *

A classification of the materials used in the construction of Ottawa buildings during the years 1909 and 1910 is most interesting.

Classified as follows:

	1909	1910
Total permits issued	683	671
Solid brick or stone	$2,763,400	$1,136,325
Concrete	352,075	370,650
Brick veneer	1,253,840	1,364,350
Iron clad	18,700	68,850
Wood or frame	139,575	82,475
Total for year	$4,527,590	$3,022,650

Jan. 1911, permits, 10, $29,100; Jan. 1910, permits, 25, $57,650

In a paper on "Standards of Ventilation," by Dr. W. A. Evans, Health Commissioner of Chicago, he classed the injurious effects of bad air into two groups—air-borne infections and air-caused conditions. In the first are included colds, pneumonia and consumption, and in the second drowsiness, anaemia and headache. He stated that with air there can be no single standard of efficiency of ventilation in the present state of our medical and bacteriological information. The standard of ventilation must consist of humidity, temperature, carbonic dioxide, volume of air and cubic feet of space. Many interesting points were presented, showing that the present state of ventilation is entirely unsatisfactory, and demonstrating the need of immediate consideration of the subject of ventilation.

Third Annual Convention of the Canadian Cement and Concrete Association

Among the many associations in Canada which have for their origin, and object for existence, the propagation of exact knowledge along different lines, the Canadian Cement and Concrete Association is one to which a good percentage of builders evince a cordial interest.

No material of construction has in so short a time made such wonderful strides in so many different fields of labor. While cement is really as old as the hills and found use in early Roman days, yet the product as used to-day is of comparatively recent origin.

The field for cement and concrete is ever enlarging with more definite knowledge of its possibilities, and the advance of inventions which render its application more and more economical and its results more certain. The convention this year is being held in Toronto, March 6th to 11th. Many valuable papers will be read by noted authorities in the cement world. The following are a few of the papers and the authors:

"Cement Concrete in Highway Construction," by W. A. McLean, Provincial Engineer of Highways for Ontario.

"Cement Surfaces and Finishes," by Robt. Cathcart, Glidden Varnish Co., Cleveland.

"Concrete Blocks," by R. F. Havlik, of the Ideal Concrete Machinery Co., South Bend, Indiana.

"Prevention of Corrosion in Metal Lath," by C. W. Noble, Consulting Engineer, Toronto.

E. A. James, Editor of *Canadian Engineer,* contributes a paper on "The Necessity of Inspection in Concrete Work."

Richard L. Humphrey, President National Association of Cement Users, and Director United States Structural Materials Testing Laboratory, will also speak.

This is only a very incomplete list.

During the same week and under the auspices of the Association, the Third Annual Cement and Concrete Exhibition will be held at the St. Lawrence Arena. This exhibition will show many new and interesting advances in concrete work.

The Canada Cement Co. will exhibit a complete cement mill in operation, in miniature. The rotary kiln which in the commercial mill runs from 60 to 100 feet, in this is only eight. This proportion is maintained throughout, but every detail is so complete that the mill will be quite capable of producing cement of the highest quality.

Steel & Radiation Limited (Expanded Metal Co), will exhibit a "Cement Gun." This is not an instrument of warfare but the very latest advance in concrete machinery. In fact, the gun on exhibition is one of the only two or three in existence. This machine is expected to revolutionize some branches of cement work, particularly that in reference to finishing and refinishing concrete surfaces.

These are only two exhibits of many. Every builder should attend the Exhibition and see them.

The BUILDER AND CONTRACTOR will have a booth there and will be pleased to meet all who attend, to exchange ideas.

New Town Made to Order

We are apt to imagine in Canada that with our immense immigration and mushroom growth of towns that we are in a class by ourselves, that we are just a little bit smarter and do things a little better than they do in the "Old Land." It must surprise some of our readers to see an item such as this in our daily papers:

London, Feb. 1.—After a competition among sixty-two architects, many of them of international distinction, plans have been chosen for the great ready-made town on the outskirts of London which is to be created on the Ruislip estate of King's College, Cambridge. The place is eighteen minutes by fast trains from the West End. The estates of the college extend to some 1,300 acres in the two Middlesex parishes of Northwood and Ruislip. An "aerated suburb" is what the papers call it.

The Ruislip town-planning experiment will be the most extensive undertaking of the kind in the world. There are to be more than 7,600 houses, divided according to rental as follows:

$500 or more rent	21
Not exceeding $500 rent	524
Not exceeding $300 rent	3,541
Not exceeding $150 rent	3,556
Total	7,642

About 337 acres will be devoted to building plots, 259 acres to parks and other open spaces, and 184 acres to roads. Nowhere on the estate are there to be more than ten houses on an acre. This is the same rule as is usually followed in suburban development in America. In some places in Ruislip there will be only two or three dwellings per acre.

The central avenue of the Gardentown is to have a fifty-foot grass strip along its centre, flanked on either side by thirty-foot roadway; a church will face each end of the avenue. There are to be, of course, a theatre, a club, a municipal building, schools, an arcade, a concert hall, a library, a monument, a golf course, a hospital, an abattoir, baths, a laundry, a garage, possibly an aviation ground, and every other up-to-date suburban facility.

The Ruislip Manor Garden Suburb is the first great scheme under the new Act of Parliament. The London County Council is carrying forward several large suburban housing developments.

State Senator Shanley of New Haven, Conn., has introduced a bill in the legislature of that state providing for a board of examiners of plumbers in all cities where there is a population exceeding 10,000. The proposed board is to consist of one master plumber, one journeyman and one member of the board of health to be appointed by the mayor.

Lessons for the Builder from Fire Chiefs' Reports

The builder, architect, and contractor must devote more attention, when constructing dwellings and other structures, to the question of fire risk. By attention to several small, though important details, the householder may be assisted in the fight which should be waged against the alarming loss by fire in Canada every year. According to the *Monetary Times* fire register, more than $64,000 a day was burned last year in fire waste and at the same time five persons every week lost their lives in fires. Simple causes have largely contributed to this result and great assistance to the good cause of smaller fire waste can be rendered by the builder and his colleagues. The reports of the various fire chiefs now being made public throw some interesting light upon this vital matter.

In Calgary, for instance, Fire Chief Smart tells us that of the 164 calls he received, the greatest number of fires were caused by defective chimneys. Twenty-eight fires originated from this cause. Stove pipes caused eleven, mice chewing at sulphur on matches caused three, ashes and hot coals ten, children and matches seven, cigar and cigarette stubs eight, electric wires two, lamp explosions two, incendiarism one, smoking in bed one.

Of the total risk of $867,195 on buildings and $632,741 on the contents, the losses amounted to $41,718 on buildings and $92,035 on the contents. The insurance carried was $503,304 on buildings and $361,100 on the contents.

Fire Chief Smart recommends that by-laws be passed limiting the height of buildings to eight storeys or between 90 and 100 feet.

Last year in Brandon, so Fire Chief Melhuish reports, the total fire loss in the city, outside the asylum fire over which the department had no control, was only $19,385, which is a good record in a city with a population of about fourteen thousand. The losses in 1909 were $92,242. The fires attended were in thirty-eight instances in wood buildings, twenty-nine fires were in brick and stone structures, twelve in outbuildings, cars, rubbish and burning grass and twenty-six of the calls were to chimney fires.

The causes of the fires and alarms for the year 1910 were as follows: Children playing with matches, 7; burning chimneys, 33; burnings rubbish, 12; defective electric wiring, 2; defective furnaces, 3; defective grates, 2; defective stoves and ranges, 4; defective stove pipes, 2; escaping smoke taken for fire, 3; explosion of coal stoves and lamps, 2; explosion of gasoline, 3; false alarms, 3; fireworks, 1; candle in contact with curtains, 1; hot ashes, 2; ignition of boiling tar, 1; practice runs for "Underwriters, etc.", 2; prairie fires, 2; spark from locomotive engines, 3; spontaneous combustion, 2; sparks from forge, 1; overturned incense lamp, 1; overheated stoves and pipes, 4; overturned lantern in car, 1; unknown causes, 8; total, 105.

The amount of fire loss on buildings and contents for the year in Victoria, B.C., (not including the big fire of October 26th), amounts to $41,771, at the rate of $213.11½ distributed over each of the 197 alarms received. The other amounted to $552,125. Total loss on buildings and contents, $573,896.60, with insurance of $832,305.00.

Last year at Ottawa, fire chief Graham reports 316 alarms received, being an increase of 89 over 1909. The estimated loss involved by the 316 alarms was $138,420, with an insurance of $1,312,905, the total fire loss being a decrease of $142,099, from 1909, notwithstanding the fact that two fires alone, for which extra alarms were sounded, resulted in an estimated loss of $66,225. On the 314 remaining fires the loss entailed was only $72,195.

"The decrease in the amount of fire loss," says the report, "is most gratifying and is believed to be due, in great part, to efforts looking toward the prevention of fire, which work has come to be recognized as of equal importance with the actual extinguishing of fire." The inspection of mercantile establishments, hotels, apartment houses, office buildings, yards, cellars, etc., was vigorously prosecuted, 5,972 calls in all being made by the chief and his men.

The enforcement of the by-laws relating to the installation of fire escapes, fire extinguishers, alarm gongs, signal lights, etc., in hotels, apartment houses, mercantile houses, office buildings, schools, hospitals, convents, asylums, etc., has been made the object of special care. Referring to his inspection of the government buildings at the invitation of the Minister of Public Works, the chief says that his report has not been acted upon to any great extent. The theatres and moving picture places were rigorously inspected at regular intervals, and the regulations strictly enforced.

In all seventy-five fire alarms were received at Regina during 1910 as compared with fifty-five in 1909. The total loss suffered by these fires amounts to $6,528.10, which is $1,616.26 less than last year. Fire Chief White estimates the amount of property at risk at which there have been actual fires and on which chemicals and water have been used at $200,000. Divided into the various classes of buildings it is found that in January two of the five conflagrations were in brick or cement buildings and three in frame; March, 2 frame, 1 veneer or iron, 1 false; April, 1 brick, 3 frame, 3 other than buildings; May, 1 brick, 3 frame, 1 other than buildings; 1 veneer or iron; June, 4 frame. July, 1 brick, 4 frame, 5 other than buildings, 3 false; August, 2 brick, 4 frame, 1 veneer or iron, 2 false. September, 2 other than buildings, 1 veneer or iron. November, 1 brick, 1 frame, 1 other than buildings. December, 7 frame, 3 false.

Fire Chief Lewis of Brantford, reports the loss on buildings last year at $3,795. The causes of alarms were as follows:—sparks from chimney, 2; burning rubbish, 2; gas stoves, 3; heating coils, chimneys, 5; stovepipes, 3; cupola, 2; coal oil stove, 1; electric wire, 2; stove, 1; hot ashes, 1; children and matches, 6; lighted candle, 1; coal oil lamps, 2; boiling tar, 1; oily waste, 2; boiling varnish, 2; gas jet, 1.

At a recent annual meeting of the Montreal Builders Exchange the building laws of the city of Montreal came in for some scathing denunciations. "It would require little less than a Niagara to put out a fire with five minutes' start in some buildings now going up in Montreal. Neither the Fire Department nor the Water Department can accomplish impossibilities. Some of these structures are as surely predestined to the flames as an un-elect Calvinist," was the way President Joseph Arcand opened his address.

The President then made a strong plea for the revision of the Building Code, and a more strict enforcement of the laws regarding the inspection of buildings. He designated many of the structures now being erected as veritable fire-traps.

Dealing with building operations the President showed that the official values for Greater Montreal during the year 1910 were $21,443,861, but stated that these figures really underestimated the actual values, as building permits issued by the city proper only represented at the most 60 per cent. of their real worth. During 1909 the statistics for Greater Montreal showed buildings to the value of $19,643,193. Mr. Arcand pointed out that while this growth was satisfactory it was hardly sufficient to keep pace with the annual increase in population, which he estimated at 50,000 per year. The actual figures for residential property last year were 1,432 houses and 3,051 tenements, hardly enough to accommodate the 50,000 new arrivals.

The report also touched on the increase in land values, showing that these had increased to three and four times what they were ten years ago. This was especially true of St. James St. and St. Catherine St. properties.

Limiting the Height of Buildings

It is most likely that buildings in Calgary of more than eight storeys will be prohibited and that only one house will be allowed on one lot. The following resolution came up before the city council in that progressive municipality recently:

That buildings in Calgary should be limited to eight storeys, or about 100 feet in height; that the first-class fire limits should be extended; that the business district should be enlarged; that no more than one house should be built on one lot; that restrictions should be placed upon the building of apartment houses, and the establishment of a board of appeals from which people who had differences of opinion with the building inspector might carry their complaints, were the suggestions made by Building Inspector Harrison at the meeting of the legislative committee of the council held recently.

These proposed amendments to the building by-laws were discussed, and it was decided to leave them in the hands of a committee consisting of Building Inspector Harrison, Ald. Lathwell, chairman of the legislative committee, and the city commissioners. This committee will go over the proposed changes and draft amendments to the by-law covering them.

Ald. Watson suggested relative to the proposal to limit the height of buildings, that they should be graded according to the width of the streets. Eight storeys he thought would be all right for a 66-foot street, ten storeys for a 75-foot street, and fourteen storeys on a 100-foot street.

Building Inspector Harrison explained that he had been prompted to suggest that restrictions be placed upon apartment houses because so many frame apartment houses three storeys in height and built to accommodate 16 families, were being built in different parts of the city.

The proposed amendment that only one house be permitted on one lot is intended to prevent the erection of buildings on the rear end of lots.

The city of Vancouver has passed a by-law to the effect that no structure may now be erected within its limits of a greater height than 120 feet, and of no greater number of storeys than ten. The following amendments in regard to the height of buildings have been approved of, and, it is practically certain, will be included in the by-laws:

Frame and veneer construction—Allowed to a total height of 37 feet, comprised in three storeys; ordinary and pier construction—allowed to a total height of 65 feet, comprised in five storeys; mill construction—allowed to a total height of 75 feet, comprised in six storeys; slow burning construction—allowed to a total height of 97 feet, comprised in eight storeys.

It is apparent that the men who framed the recommendations in connection with this reform have been figuring on a basis of 12 feet per storey. It will at once appear to any who are in the least familiar with building operations, or who will even give the matter a moment's thought, that a building of 120 feet must be constructed on a somewhat different plan than that which allows twelve feet to a storey. Such a structure would be the reverse of architecturally symmetrical. An improvement might be made, of course, by confining the number of storeys to nine or ten, but that would mean a much less attractive proposition to the investor, and there is no doubt that the carrying out of such a by-law will have an unfavorable effect with the men who are building for dividends. For even the three-storey frame building a limit in height of thirty-seven feet does not give the builder sufficient scope. The enforcing of the by-law in this line of building will mean the erection of many houses with comparatively low ceiled rooms, and a consequent lack of hygienic conditions. The latter condition would, no doubt, result in the case of high office buildings. The law furnishes an incentive to crowd as many storeys as possible under a roof which must not be more than 120 feet from the ground.

Charging for Work "by the Day"

The question of proper method of making up charges for building work done "by the day" has recently been discussed by the Master Builders' Association of Boston, and the following suggestion has been made: First, make up the actual amount paid to workmen employed; add to this a proper percentage for "supervision and use of tools" (this percentage should comprehend office and shop maintenance and liability insurance); then add actual cost of materials used; this will give the total sum upon which the contractor is entitled to a percentage "for profit," which percentage will necessarily be variable on account of varying conditions under which work is executed as well as variable on account of amount of work involved. For especially difficult work it is plain that a larger "profit-percentage" should be charged than on simple, straightforward work, and a larger "profit-percentage" would be proper where the work is very limited in amount than on work involving a considerable amount.

Building By-Laws and Sanitary Dwellings

Conditions Which are Pre-eminently Essential in Sanitary House Construction

Although conditions are for the most part radically different in Canada from those prevailing in England, still we can obtain many valuable pointers from them. In a paper read before the Northwestern Sanitary Inspectors' Association at Liverpool,England, recently, Tom Robinson, M.R.S.I., dwelt on the following as being pre-eminently essential in sanitary house construction:—

1. The prevention of dampness.
2. The sufficiency of air space around dwellings.
3. Size and height of rooms, window area, ventilation, floors.
4. Compulsory provision of (1) coal place, (2) wash-house, (3) pantry or larder, and (4) bathroom.
5. Drainage, water closets, etc., dustbins.
6. Street planning, density per acre.

"It must be readily" conceded ,said Mr. Robinson, "that dryness of house and site is of primary importance. Dampness, we are told, favors the development of consumption, diphtheria, rheumatism, and other serious diseases, and the precautions to be observed require very close supervision.

"As regards the site, and especially the low-lying sites more or less necessarily damp, I think the provisions of the Local Government Board's new Model By-Laws are excellent—i.e., the raising of the site to a definite height as regards any particular area above Ordnance Datum. The only provisions in the usual by-laws in most districts affecting the height of the floor level are: (1) That the dampcourse must be below lowest timbers and 6 inches above ground level. (2) That the lowest story must be of such level as will allow effectual drainage. While these two clauses are very necessary and useful, yet they do not in any average case fix any definite height of floor level. We are now asking the Local Government Board for a by-law which fixes the minimum height for floor above the kerb level at 18 inches. The exact position of the dampcourse in relation to outside ground level is of much importance, and my observation in various districts leads me to the opinion that this necessary provision is more honored in the breach than the observance. But it is vital, and should be unflinchingly enforced. The modern tendency is to abandon the idea of basements, and this should make the correct and effectual dampcourse more easy of attainment, as well as to simplify the gradient of the drainage system.

"As regards the material to be used for dampcourse it is important to notice the exact wording of the By-Law Model Series (20), viz: 'Sheet lead, asphalt, or slates laid in cement, or of other not less durable material impervious to moisture.' In my judgment this by-law has been most systematically disregarded in all those districts where the common, cheap, and ineffective 'tarred felt' (or shall I call it 'tarred sand paper') has been allowed—see Model Clause, page 90. The material must not only be impervious, it must be durable. Many good forms of bitumen dampcourse are on the market, and are preferable in my opinion to either slates or tarred felt. Sheet lead I have never seen used on ordinary speculative buildings. Pitch and tar carefully graded, and of proper consistency and applied to the full width of the wall three-eighth-inch to one-half-inch thick may safely be passed. But when all due care has been taken as to level and quality of dampcourse it is a very common occurrence in houses of from £10 to £100 rental to find that the gardener has paid so much attention to the formation of nicely sloped and really artistic flower beds around the house that the soil has been banked up to cover both dampcourse and air gratings for ventilating under the floors. Occupiers and gardeners need some education on this point, for they not only grow flowers, but they propagate the bacillus which eventuates in 'dry rot' and consequent risks to health. And in this connection I may observe that even yet in the buildings of an average class the ventilation under the floors is inadequate. We must insist on through ventilation, back to front and side to side, with a minimum of blind ends.

"Concerning damp sites, concreting is not of very much use, unless fine stuff is used on the surface and properly floated or grouted. The idea that ordinary concrete is impervious to moisture is fallacious. Even when this process is carefully done, I suggest that the surface of the concrete under the floor should be at a higher level than the adjoining ground outside the building. Where the natural level of the ground water is within 2 feet or 3 feet of the surface, the site could with advantage be covered with good Portland cement concrete, put on in two layers with a layer of asphalt between, and the provisions of By-law 59 relating to subsoil drainage should be enforced. Compliance with these provisions, and the floor level raised 18 inches or 2 feet above kerb level ought to make a fairly dry habitation, providing always that the walls are properly built, and the roof, gutters, and downspouts finished in a workmanlike manner. There can be no excuse for dampness or dry rot except the excuse of unpardonable ignorance, carelessness, stupidity, or a criminal haste to make money regardless of consequences.

"2. Air Space Around Dwellings.—Most sanitary inspectors to-day can, with a fair amount of accuracy, give the death-rate of any locality if the density of population per acre is stated. We now realize that overcrowding on space tends to ill health, and that ideal conditions are impossible when houses are too closely crowded together. Nearly every town in the United Kingdom has been to a greater or lesser degree too closely packed together, and it is in this relation that more adequate powers should be given to Local Authorities to enable them to secure (1) Wider streets, (2) The compulsory planning on the detached or semi-detached principle. (3) A minimum air space at the rear of 500 square feet per house. (4) A standard number of houses per acre. With reference to the width of new streets, I suggest that the fixed amount of 36 or 39 feet, now in vogue should be abolished, and the width should be determined more by the possibilities of the use and amount of traffic which the street may be expected to serve. The following widths are suggested: Business thoroughfares of large towns, 80 feet to 100 feet; ordinary streets in residential districts, 45 feet to 60 feet; minimum for any street, 45 feet.

"This would allow of good footwalks and possibly a boulevard on one side at least of every street. In streets where the traffic is purely of a domestic character, the carriageway might be reduced to 18 feet or 20 feet, and the remainder utilized for grass plots, etc. Our new by-laws provide for eight-foot footpaths, twenty-three-foot carriageway.

"2. The building of long blocks of houses, terrace fashion, as we may call it by way of a compliment, appears to me to be unjustifiable from every point of view, and I wish to lay special emphasis on this point.

"The disadvantages are: (1) Back streets required from 9 feet to 16 feet in width. These require paving, sewering and lighting, and the maintenance cost, which is permanent, falls on the rates in most cases. (2) In the case of vermin the occupiers of adjoining houses participate in the resulting annoyance and discomfort caused by the careless habits of others. (3) More danger in case of fire. (4) Greater difficulty of obtaining good light by means of external windows. (5) Unnecessary crowding of houses together. (6) A dull, drab, dreary sameness, no variety. These disadvantages are all avoided by building on the semi-detached principle, and in my judgment the result is fully commensurate with the slightly increased outlay. The land which would otherwise form the back street can be used for back garden, and there is a reasonable possibility of having a sufficient amount of direct sunlight and fresh air all through the house. We are encouraging this idea in our district, and with conspicuous success.

"3. The question of the amount of air space at the rear of houses requires reconsideration. In many districts houses are being built with from 10 feet to 15 feet from the back of the house to the boundary wall. The practice varies very much. Our by-laws prescribe: (1) A minimum of 200 square feet open space; (2) Twenty feet clear space measured at right angles to rear of building.

"Some districts I know insist only upon 150 square feet, and even then that amount soon becomes decreased by the erection of coal place, store shed, poultry house, etc. I incline to the view that the open space at the rear should not be less than 500 square feet, that back passages should be prohibited, entrance for all purposes from front street, with a side passage 4 feet wide as a minimum. There is no by-law at present fixing the width of such side entrance.

"Some elasticity on the foregoing amounts could be allowed, providing the total number of houses were kept down to a minimum of twelve or sixteen to the acre. Under existing by-laws it is easily possible to build from forty to sixty houses on an acre (excluding roads), a number which cannot be supported from a health standpoint. We must advocate hygiene and common sense development; we never find Port Sunlight, Bourneville and Letchworth being held up to ridicule; they are laid out on the rational and healthy principles which we admire and commend. In this connection, we are now able to produce direct evidence of the advantages of hygienic surroundings. Let me trouble you to notice the death-rates in Port Sunlight, Bourneville, Hoylake, and West Kirby, as compared with those for England and Wales:

Average Death Rate, 1900–8.

England and Wales	15.69
Port Sunlight	9.63
*Hoylake and West Kirby	11.74
Liverpool	20.4
Bourneville, 1902–7	6.3

*Not corrected for deaths of those who come here as invalids.

Infantile Mortality, 1902–7.

	Per 1,000 births.
England and Wales	131.2
Bourneville	80.2
Hoylake and West Kirby	92.2
Liverpool	164.3

Some remarkable figures have been just published with reference to the average heights and weights of school boys, fourteen years of age, in the various schools in Liverpool and Port Sunlight, and while we must be careful not to impute all the differences shown to the superior housing conditions, it must be an undeniable fact that the general sanitary advantages enjoyed by those of Port Sunlight have a very important bearing on the astounding disparity revealed. Briefly the results are as follows:

	Height	Weight
Liverpool—		
Higher Grade Schools	61.7	94.5
Council Scholls (best)	58.2	95.8
Council Schools(medium)	56.2	75.8
Council Schools (poor)	55.2	71.1
Port Sunlight Schools	62.2	108.0

"This table confirms a long-standing impression of mine, viz., that given good surroundings, clean, airy dwellings, accompanied by regular employment, regular wages, and fair general economic conditions, the British artisan and his family will compare very favorably with any class of society for physique, for sound, healthy living, for mental, moral and physical stamina. It is to the extension of garden cities, coupled with, and not separated from, our industrial concerns, that we must look for the uplifting of the physical, moral and economic standard of British manhood and woman hood.

"Before I leave this part of our subject I should like to draw attention to the report recently published by the Local Government Board on 'Back-to-Back Houses.' This is the most comprehensive report on this subject that we have ever had, and it contains evidence directly supporting my claim for the abolition of the continuous block system, whether 'back-to-back' or otherwise. In the report Dr. Darra Mair says in his summary and conclusions, page 27: (1) The death rate from all causes was greater in the 'back-to-back' houses than in the 'through' houses to the extent of 15 per cent. (2) The excess of mortality in 'back-to-back' houses built in continuous rows was greater still, amounting on an average to 20 per cent. (3) The death-rates from all causes in 'through' houses (continuous blocks) and in 'back-to-back' houses with side ventilation (blocks of four), were about equal.

"I suggest, therefore, that if 'back-to-back' houses built in blocks of four are equal from the general hygienic standpoint, as indicated in vital statistics, to the continuous block system of 'through' houses, then 'through' houses built in pairs, with a reasonable amount of air space both back and front, will be an advance well worthy of accomplishment.

"I have here two or three plans, approved by my Council, of small houses on the semi-detached principle. They are not ideal, but they show what has been done, and done in every case by ordinary builders catering for ordinary working-class tenants.

"Plan 1 shows fourteen houses built or in course of erection. These fourteen houses occupy just over one acre, exclusive of the street. Rent, 6s. 5d. per week. With baths, 7s. 4d. per week. Hot and cold water throughout. Air space at the rear of each house equals 1,000 square feet, just sufficient for a nice little kitchen garden, and a small garden at the front. Plan No. 2: Small cottages with more limited space. These are at the rate of 32 to the acre. Side entrances only 4 feet wide. Air space at the rear of each cottage equals 410 square feet clear. No front garden.

"I could show you a large number of other plans of semi-detached cottages which have been built in my district, all tending to show that as far as we are concerned we are doing our level best to develop and extend the idea that the semi-detached system is preferable from every point of view to the continuous block system, and the sooner it is made compulsory the better. Housing schemes which fail to provide a self-contained house, with just a bit of garden where a man and his family can regard themselves as supreme, 'and on their own,' are not to my liking, and I venture to think that some day such provision will be regarded with contempt by an educated democracy.

"3. Turning now to the house itself and the by-laws which govern the height and size of rooms, I think I can find some points of interest and some possible suggestions for improvement. I think I am correct in saying that the general by-laws in operation in this country fix no minimum of floor area for any room. It is permissible to build bedrooms 8 feet, or even less, without contravening any by-law. Surely some minimum should be fixed, and I suggest 12 feet by 12 feet as a minimum for every bedroom, dining-room, or living room. The window area by-law is reasonably adequate, but is frequently lost sight of. If every room has window area one-tenth of floor area, and the window is open to the external air, we are assured of ample light. As regards height of rooms, I think the minimum should be 9 feet 6 inches, and there need not be much deviation. Height simply to increase cubic space is not of much use, floor area is more important. If we get window area one-tenth of floor area, and every window made to open for one-half its area. we need not trouble much about special means of ventilation. We shall secure ample light and air.

"I am convinced that we can unhesitatingly advocate the general abolition of the ordinary floor (ground floor), resting on joists with more or less space beneath. My experience has taught me, that in a large number of cases wood block floors, or boards nailed into breeze concrete, can be provided at very little extra cost, and when properly laid on good concrete they are durable, sanitary, and in every way preferable. Most new houses in my district have these solid floors, and they are a real success.

"4. Building by-laws leave the provision of coal place, wash house, larder or pantry, and bathroom optional. I think it is time that each and every one of these necessary adjuncts to healthy domestic life should be made compulsory, in all new houses at any rate.

"I hate to see the coals stored under the staircase, or in some other corner of the house adjacent to the milk and butter, and it will not be much use spending money to teach children domestic and personal cleanliness unless provision is made for their practical applications at home."

Book Notes

NEW PUBLICATIONS

Framing. Describing house, barn and roof framing by Wm. A. Radford; 338 pages, 6 x 9 inches; 182 illustrations. Price $1.00.

"Framing" is the largest, the most complete and the most instructive building book ever written. It deals with the subject of framing in its multitude of forms and designs in a most thorough manner. Nothing is omitted that will help and guide on the construction of houses, barns, roofs, etc., while particular care has been taken to exclude any and every method of framing that has not been given a thorough and convincing test by experienced builders. Practical information is the keynote of "Framing." By practical, we mean information that can be successfully applied to the everyday work of the average carpenter, builder and contractor, as well as the more intricate forms of framing that come less often, but about which it is necessary to be fully posted. The book presents problems as they have been worked out by well-known architects and the man on the job. It is illustrated with over 100 pages of detail drawings, diagrams, detail plates, etc., including many pages of full-page plates never before published, reproducing architects' original drawings, and also details of buildings in all stages of construction, and is the largest book on this subject that has ever been published. No book attempting to treat this important part of construction has ever before so successfully covered the ground. Every phase, part and detail of framing a house, a roof, a barn, or other structure is given and treated fully and exhaustively, with complete details showing each successive step to be taken. "Framing" is practical in that it shows the easiest and most common-sense way to do the work. It does not confine its descriptions to one person's ways or views, but shows many examples of each kind of framing, all of which have been fully tested by experienced workmen and can be relied upon to be absolutely correct.

The Steel Square and its Uses. A valuable new book by Wm. A. Radford, assisted by Wm. Reuther and Alfred W. Woods. Two large volumes, 600 pages, 6 x 9 inches; 300 illustrations. Price, $2.00 per set.

"The Steel Square" is a brand new book from cover to cover, just published. The largest and most complete book on the subject ever published. Written in plain, simple language that every workman can understand from start to finish. Information of value that has appeared in former books on the subject, appears in this book, but all simplified and better explained. It is a complete encyclopædia about the steel square, and is a practical book showing how the square is used for the laying out of all sorts of rafters, finding the length of jacks, hips, and valleys; hopper bevels, calculating, measuring, etc. This book covers the subject of roof framing from start to finish, from a simple roof to complicated hips and valleys and tower work. The "Steel Square" contains special chapters showing how the square is used for laying out mortises, tenons, shoulders, braces, etc., and is very elaborately illustrated by over 300 special drawings that have been expressly made for this book. They will show you plainly how to do the job without wasting time and money on cutting and trying. Each volume of the "Steel Square" contains 50 designs of modern low cost houses, showing perspective and floor plans. Either volume can be had separately at one dollar each.

These or any other technical books published may be obtained through Dept. K, The Builder and Contractor

Law and The Builder

Recent Legal Discussions of Interest to Builders and Contractors

WORKMEN'S COMPENSATION

In the case of McDonald v. Murphy, an appeal was taken to the Divisional Court by defendant from the judgment of Mulock, C. J., of October 4, 1910. This action, brought by the widow and children of John McDonald, under the workmen's compensation for injuries act, claimed $6,000 damages for the death of said John McDonald, alleged to have been caused while in defendant's employ by the falling of a derrick upon him in defendant's quarry. At the trial judgment was given plaintiffs for $1,000 and costs. Judgment: The common law obligation of the Master is to maintain a suitable and safe place for machinery and appliances for the work to be done, and to warn the servants of all dangers known, or which ought to be known to him unless already known to the servant. The jury have found that the Master was negligent in removing the third guy from the derrick without first making the boom fast by anchoring and so securing the stability of the whole until this was brought about by the placing of the "stiff legs." This was the cause of the accident. The jury have found that there was no contributory negligence. The deceased was lawfully upon the premises, and the fact that at the time the derrick fell he was climbing the mast is a mere incident, unless his so doing amounted to contributory negligence. The appeal should be dismissed with costs.

BUILDING CONTRACT—FAILURE TO COMPLY WITH PLANS, ETC.

By a written agreement the plaintiffs agreed to build and furnish all material for a certain building for the defendant, according to plans and specifications, for a lump sum of $4,367, payable in "three equal payments, one to be made when roof is on building, one when plastered, balance when job is completed (thirty days after completion of building.)" It was held by Mr. Justice Clements, upon the evidence, that the plaintiffs had not built and furnished all material for the defendant's building according to the plans and specifications; and that there was no evidence that the defendant had accepted what work the plaintiffs did do as a fulfilment of the contract. The plaintiffs were, therefore, not entitled to recover upon the written contract. The doctrine of "substantial performance" has no place in the British Columbia jurisprudence. The decisions in Ellis v. Hamlen, 3 Taunt. 52, Lakin v. Nuttall, 3 S.C.R. 685, Sherlock v. Powell, 26 A.R. 407, and The Madras, 67 L.J.P. 53, were followed.

The plaintiffs asked leave to amend so as to claim as upon a contract to pay as much as they were entitled to, but it was held that no such implied contract was to be inferred merely from the taking or retaining possession of the land and the building which had become part of the land; and that there was nothing more than that in this case. There was no evidence of knowledge on the defendant's part of the plaintiff's departure from the plans and specifications; to make out a case either of waiver and acceptance, or the substitution of a new agreement, knowledge of the breach on the defendant's part must be shown and must be followed by or coupled with some attitude of acquiescence adopted towards and made manifest to the plaintiffs, and sufficient to warn reasonable men in concluding, either that what the plaintiffs had done was accepted as a fulfilment of the actual existing contract, or that the defendant was a consenting party to an alteration in the contract and the substitution of a new scale of payment. On these points the decisions in Munro v. Butt, 8 E. and B. 738, Sumpter v. Hedges, 67 L.J.Q.B. 545, Whitaker v. Dunn, 3 Times L. R. 602, and Forman v. The Liddesdale, 69 L.J.P. 44, 49, were followed.

The defendant had paid the plaintiffs $1,400, and this action was for a few dollars of the first payment, and for the whole of the second and third payments. As to this, the Court held that, although the defendant had at one time intimated his willingness, upon certain conditions, to make the second payment, there was no evidence thereby of waiver and acceptance, because it was not shown that the intimation was made with knowledge of the breaches of the agreement.

The Court also held, (1) that the right of the plaintiffs to call for any one of the three payments was conditional upon the work, so far as completed up to the period specified, being completed according to contract; (2) that, upon the evidence, the plaintiffs were entitled to recover for work done and goods supplied outside of the written contract, at the request, expressed or implied, of the defendant; and (3) that the defendant's counterclaim for damages, being much more than offset by the difference between the value of the building and what he had paid for it, should not be allowed; the claim for $5 a day for delay in the completion of the building was a claim for a penalty, and the plaintiffs should be relieved therefrom.

(McDonald v. Simons, 15, Western L. R., page 218.)

WOODTRIM QUESTION BEFORE THE COURTS

The long fight of the union carpenters to get building contractors to use none but union-made wood trim on buildings which has been carried on by carpenters refusing to handle trim made by non-union firms, has been taken to the New York courts. The Albro J. Newton Company, of Brooklyn, a woodworking manufacturing firm which employs its men on the open shop plan, has secured from Supreme Court Justice Crane, of Brooklyn, a preliminary injunction restraining the Joint District Council of New York and vicinity, of the United Brotherhood of Carpenters and Joiners of America, and the Amalgamated Carpenters of America, its officers and members, from ordering strikes against the use of the product of the firm, or otherwise interfering with its business. It is said that the case will be made a test one. The union carpenters have for many years been trying, by ordering strikes or by other means, to induce building contractors to pledge themselves not to use any but union-made wood trim, but without success, or only with partial success. The preliminary injunction restrains the defendants from combining to prevent the use of the product of the plaintiff, or by strikes or boycotts preventing its use by contractors.

Appended to the application for the injunction are affidavits from building contractors and others to the effect that, after having contracted with the plaintiff for wood trim, the carpenters either refused to handle it, or went on strike at the orders of agents of the two organizations of carpenters mentioned. The application also contains an affidavit by Albro J. Newton, head of the Albro J. Newton Company, to the effect that the firm had on hand a large quantity of valuable stock which had been manufactured to order of contractors, who could not use it because their carpenters, who were all union men, refused to handle it. The question of non-union wood trim had been responsible for many strikes, and this case would be used as a precedent. The carpenters' unions have been for years trying to force the Master Carpenters' Association in its trade agreement to pledge its members to use only union-made wood trim. The Association has always refused, on the ground that the union mills could not supply all the trim needed, and on the further ground that, if such a pledge were given, its members would be in unfair competition with independent contractors whose non-union trim came from cities where wages were much lower than in New York.

DAVEY vs. CITY OF CALGARY

The Alberta Building Company, Limited, contracted with the city of Calgary for the construction of the city hall, the price being $142,424. The contract was made on the 28th of August, 1907, and the company started the work of construction shortly after that date and proceeded with it until the 17th of May, 1909, when it was forced to discontinue the work by reason of the fact that the architect refused to pay an estimate which the company had presented to him in the early part of May, pursuant to the provisions of the contract. The city thereupon gave the company notice to proceed with the work and after three days' written notice to the company, which it did not comply with, the architect certified that the company had refused and failed to proceed with the work, whereupon the city took the contract out of the company's hands and set about the completion of the building itself, retaining for that purpose all of the company's plant and materials which were placed on the ground.

The company thereupon commenced an action against the city to recover the value of the work done by it and damages for its wrongful dismissal from the work and for the wrongful detention of its plant by the city, in all a sum of $116,000.

The case was tried before Mr. Justice Scott of the Supreme Court of Alberta, at Calgary, in November of last year. Judgment was recently given in favor of the plaintiff. The facts established at the trial were, that the company presented monthly estimates to the architect of the amount earned by it under the contract, all of which estimates were honored by the architect and paid by the city down to and inclusive of the estimate issued in April, 1909. Between the date of the payment of the April estimate and the 4th of May, 1909, the company had done work and supplied material to an amount which admittedly exceeded $8,000, and the architect admitted that all of the certificates which he had issued to the company had been properly earned by it. His failure to issue a certificate on the May estimate when so large an amount of work had been done since the April estimate, was due, according to the company's contention, to the fact that he had been improperly interfered with by the city officials in the matter and had not maintained a fair and impartial position between the parties. Evidence was given at the trial of statements made by the city treasurer, by the architect and by a member of the building committee of the city council to the effect that the architect had been practically instructed by the city officials not to pay anything more on the contract.

Evidence was given to establish the fact that nearly all of the funds, which had been provided by by-law for the contract, had been expended and that a further by-law which was submitted to the people in April for additional funds, had been defeated. The judge found upon the evidence that the architect's refusal to pay the May estimate was due to the fact that he had been improperly interfered with on the part of the city and for this reason as the city council had been notified that the non-payment of the estimate would necessarily cause delay on the part of the company in prosecuting the work under the contract the duty devolved upon it to make reasonable enquiries as to whether or not the company was entitled to the payment applied for and these were not made. He holds that as the plaintiff's inability to go on with the work was due to the wrongful acts of the city and the architect, the city had no right to take advantage of its own wrong and take the contract out of the company's hands and complete the building itself, and therefore holds that the company is entitled to recover from the city the full value of the work done and the materials supplied less all proper credits to which the city is entitled for money paid to or for the company. He also holds that the city is liable in damages to the company for the wrongful detention of its plant and for damage which it has sustained in the city's hands. A reference is directed to the clerk of the court to take an account of the amount which the company is entitled to receive from the city under judgment, and when the amount is ascertained judgment will be against the city accordingly for that amount. The judgment gives to the company everything that it asks for and is therefore in every respect a complete vindication of its course of dealing in connection with this contract.

WORK AND LABOR—REVERSAL OF JUDGMENT ON THE FACTS

Appeal by the plaintiff from the judgment of the County Court of Essex dismissing the action. Lorne & Son, contractors, of Windsor, agreed with the town corporation of Sandwich to construct a sewer from Bedford street in the town to the Pittsburg dock on the Detroit River, a distance of 1,600 feet, according to plans and specifications prepared by the town engineer. Part of the work undertaken, the outermost 75 feet, was sublet by Lorne & Son to the plaintiff. The price agreed upon for this outlet was $600. The plaintiff alleged that, after he began work, a new contract was made with Lorne & Son, involving an expenditure much in excess of $600, and that the defendant, who, as surety for Lorne & Son, was obliged to take over and complete their contract, was liable as a matter of law to the plaintiff for such excess. Upon the law the trial judge held that the defendant was not liable; but, on the facts, he found that a second contract was made between the plaintiff and Lorne & Son. Upon the evidence, the Court did not agree with the finding of fact of the trial judge, but were of opinion that there was no new agreement, and that the defendant was, upon that ground, entitled to have the action dismissed. The Chancellor (Boyd) said, the Court will not readily interfere with the conclusion of a judge based upon facts and pronounced after seeing and hearing the witnesses, but the power exists and is to be exercised in proper cases. This is such a case. The evidence of the plaintiff is overborne by the weight of evidence opposed to him. Appeal dismissed with costs. (Drake v. Cadwell, 20, Ont., W. N., 282.)

Markets

Prevailing Prices of Builders' Supplies.

February 24, 1911.

CEDAR POSTS

8 feet x 6 inch top		0 30
8 feet x 7 inch top		40
8 feet x 8 inch top		50

CORNICE MATERIAL

⅞ x 2 Crown and Bed Mold	per 100 ft.	1 25
⅛ x 4 Crown and Bed Mold	per 100 ft.	2 00
⅞ x 6 Crown and Bed Mold	per 100 ft.	3 00
⅞ x 1¼ Cove	per 100 ft.	1 00

FRAME MATERIAL

⅞ x 4¾ Pulley Stile	per 100 ft.$	1 75
1⅜ x 4¾ Hanging Stile	per 100 ft.	1 25
1¾ x 4 Hanging Stile	per 100 ft.	2 25
1⅜ x 6 Hanging Stile	per 100 ft.	3 50
⅞ x 3¼ Lining	per 100 ft.	1 10
½ x ⅞ Parting Stop		60
½ x 1⅜ Sash Stop		85
1¾ x 5¾ White Pine Sash Sill or Door Jamb		4 00
1¾ x 5¾ Red Pine		3 25
⅞ x 5¾ White Pine Door Jamb No. 1 and No. 2		2 00.-1 75
3 x 6 White Pine Sub Sill		6 50
4 x 6 White Pine Sub Sill		7 50
2 x 6 Oak Sill	per lineal ft.	09
2 x 8 Oak Sill	per lineal ft.	12
2 x10 Oak Sill	per lineal ft.	15

HEMLOCK NO. 1

2 x 4 to 2 x 12 x 10 ft.	per M. ft.	21 00
2 x 4 to 2 x 12 x 12 and 14 ft.	per M. ft.	19 00
2 x 4 to 2 x 12 x 16 ft.	per M. ft.	22 00
2 x 4 to 2 x 12 x 20 ft.	per M. ft.	26 00
4 x 4 to 10 x 10 to 16 ft.	per M. ft.	21 00
1 inch Sidings		18 00.-19 00
1 x 10 inch and 12 inch Stocks		22 00

HEMLOCK NO. 2

$4.00 per M. less than No. 1

⅞ x 2 Bond Strip and Strappings	per 100 ft.	40

Sizing Joist and Scantling, $1.00 per M. extra

Dressing, $1.50 per M. extra.

LATH

No. 1, No. 2, No. 3 White Pine, 4 ft.	$	4 75.-4 25.-3 50
No. 1, No. 2, No. 3 Red Pine		4 25.-3 75.-3 00
M. R. White Pine, 48 inch,-32 inch		4 50.-2 25

PINE, Red

2 x 4, 2 x 6 x 10 to 16 ft.	$	24 00
2 x 4, 2 x 6 x 18 ft.		25 00
2 x 8 x 10 to 14 ft.		26 00
2 x 8 x 16 ft.		25 00
2 x 10 x 10 to 14 ft.		28 00
2 x 12 x 10 to 14 ft.		31 00
4 x 4, 4 x 6, 6 x 6 x 6 x 10 to 16 ft.		28 00
6 x 8, 8 x 8 x 10 to 16 ft.		20 00
1 x 10 inch Box		28 00
1 x 12 inch Box		30 00
1 inch Mill Cull Sidings		21 00
1 inch Mill Cull Stocks		24 00
⅞ x 2 Strapping and Grounds	per 100 ft.	50
2 x 2 Bridging, cut to lengths for 2 x 8 and 2 x 10 Joist, per 100 pieces		1 75

PINE DRESSED

1 x 6 No. 1 Shelving, D. 2 S.	$	35 00
1 x 8 No. 1 Shelving, D. 2 S.		36 00
1 x 10 No. 1 Shelving, D 2 S.		40 00
1 x 12 No. 1 Shelving, D. 2 S.		45 00

No. 2 or Sound Common, $5.00 per M. less in each case.

SASH AND FRAME

1⅜.-1¾ inch Sash, 2 or 4 lights, up to 3.0 x 5.6		1 00.-1 10
1⅜.-1¾ inch Sash, 2 or 4 lights, up to 4.0 x 6.0		1 25.-1 45
1¾.-1¾ inch Casements, Cellar or Fanlights, 1 to 3 lights, up to 3.0 x 2.6		50.-60
Box Frames, up to 3.0 x 6.0		2 75
Box Frames, up to 4.0 x 6.0		3 25
Door Frames, 2 x 6 Jambs and 2 x 6 Oak Sill, up to 3.6 x 7		3 75
Door Frames, with Transom 2 x 6, Jambs 2 x 6, Oak Sill		5 00
Cellar Frames, 2 x 6, Jambs and Sills		2 00
Casement Frames, 2 x 6 Jambs and Sills, up to 8 sq. ft.		2 25

SHINGLES

XXX B.C. Cedar,-Ontario Cedar	per M.$	3 50.-3 35
XX B.C. Cedar,-Ontario Cedar	per M.	3 35.-2 75

STAIR MATERIAL IN PINE

1⅛ x 10, 1⅜ x 10, treads, nosed, up to 16 ft.,	per lineal ft.$	0.05.- 06
1⅛ x 12, 1⅜ x 12, treads, nosed, up to 16 ft.,	per lineal ft.	07.-08
1⅜ x 10, 1⅜ x 12, strings, D. 4 S., up to 16 ft.,	per lineal ft.	06.-08
⅞ x 7, ⅞ x 8, Risers	per 100 ft.$	2 50.-2 75
3 x 3, 3 x 4 Hand Rail	per lineal ft.	07.-08
⅞ x 2¾ String Cap	per lineal ft.	02
1⅜ x 2¼ Nosing and Cove	per lineal ft.	03
⅜ x 1¾, ⅜ x 2½ String Mold,	per 100 ft.	1 00.-1 25
⅜ x 1⅜ and 1¾ Filling	per 100 ft.	1 25
¼ x ⅞, 1⅜ and 1¾ Filling	per 100 ft.	1 00
⅜ x ⅞	per 100 ft.	1 00
⅞ x ⅞, ⅞ x 1⅜, ⅞ x 1¾, 1⅜ x 1⅜ Balusters, per hundred		0 80.-1 00.-1 25.-1 50
4 x 4 Turned Newells, ¼ cut up to 5 ft.		1 00
5 x 5 Turned Newells, ¼ cut up to 5 ft.		1 25
6 x 6 Turned Newells, ¼ cut up to 5 ft.		1 75

STAIR MATERIAL IN HARDWOOD

1⅜ x 10, 1⅜ x 10½ to 12 Birch or Maple, nosed and cut lengths	per lineal ft. $	16.-20
1⅜ x 10, 1⅜ x 10½ to 12 Oak and Ash, nosed and cut to lengths	per lineal ft.	22.-25
3 x 4 Oak and Ash Hand Rail, 1 or 2 members	per lineal ft.	15
3 x 4 Birch Hand Rail, 1 or 2 members,	per lineal ft.	12
3 x 4 ¼-Cut Oak Veneered Hand Rail	per lineal ft.	25
⅞ x 2¾ and 3¾ Oak and Ash String Cap,	per lineal ft.	03.-04
⅞ x 1⅜ Oak Baluster, D. 4 S.	per 100 ft.	1 50
⅞ x ⅞ Oak, Ash and Birch Balusters, D. 4 S.,	per 100 ft.	1 00
⅝ x ⅞ Oak and Ash Cove	per 100 ft.	1 00
5 x 5, 6 x 6 Turned Birch Newells, up to 5 ft.		1 25.-1 75

PINE TRIM—WHITE

⅞ x 4 Casing, Clear, No. 1, No. 2	per 100 ft.$	2 50.-1 80.-1 50
⅞ x 5 Casing, Clear, No. 1, No. 2	per 100 ft.	3 00.-2 15.-1 75
⅞ x 8 Base ,Clear, No. 1, No. 2	per 100 ft.	5 00.-3 25.-2 90
⅞ x 10 Base, Clear, No. 1, No. 2	per 100 ft.	6 50.-4 25.-3 75
⅝ x ⅞ Quarter Round	per 100 ft.	60
⅝ x ⅞ Cove	per 100 ft.	70
⅞ x 6, ⅞ x 7, ⅞ x 8 Heads, No. 1	per 100 ft.	2 50.-3 00.-3 50
⅜ x ¾ and 1⅛ Neck Mold	per 100 ft.	80
1⅜ x 1¾, 1⅜ x 2¾, 1¾ x 2½ Hood Mold	per 100 ft.	2 00.-3 00.-3 50
1⅛ x 4, 1⅛ x 5 Base Blocks	per 100 ft.	3 00.-3 50
1⅛ x 3½, 1⅛ x 4½ Window Stool	per 100 ft.	2 75.-3 25

SPECIFICATIONS

Clear—Bright Sap, no defect.

No. 1—Fine dressing, clear and cut up, sound stained sap, no defect.

No. 2—Common Dressing.

Clear face Norway, priced same as No. 1

Dressing Norway, priced same as No. 2.

ROOFING

⅞ Roofing (sound knotted common pine)	per M. ft.$	30 00
⅞ Roofing, Red Pine, Spruce	per M. ft.	24 00.-25 00
⅞ Roofing, Spruce, No. 3 and M. C. Pine	per M. ft.	22 00
⅞ Roofing, Hemlock	per M. ft.	21 00

FLOORING

1⅛ Pine flooring, face strip measure	per M. ft.$	45 00
⅞ x 4 and 5 inch, No. 1, No. 2	per M. ft.	30 00.-27 00
⅞ x 4 and 5 inch, No. 1, No. 2 Red Pine	per M. ft.	28 00.-25 00
⅞ x 2½ and 3½ Georgia Pine, B. and Better	per M. ft.	45 00

SHEETING

⅞ x 4 to 6, No. 1 and No. 2, V. and B. Pine	per M. ft.	35 00.-27 00
⅞ x 4 to 6, V. and B. Spruce	per M. ft.	27 00
⅞ x 2 to 3½ V. and B. Georgia Pine, B. and Better	per M. ft.	45 00
⅜ x 2½ to 3½ V. and B., Pine, Face strip measure	per M. ft.	25 00
⅜ x 2½ to 3½ V. and B., Georgia Pine, Face strip measure	per M. ft.	28 00

SIDING

⅞, No. 1 and No. 2, Pine, Man.	per M. ft.$	35 00.-27 00
⅞, Spruce and Red Pine, Man.	per M. ft.	27 00
No. 1 and No. 2 Feather Edge	per M. ft.	28 00.-22 00

VERANDAH MATERIAL

3 x 6 Top rail,	per lineal ft. $	0 10
3 x 5 Top rail,	per lineal ft.	09
3 x 4 Top rail,	per lineal ft.	06
2 x 6 Bottom rail,	per lineal ft.	05
2 x 5 Bottom rail,	per lineal ft.	04½
2 x 4 Bottom rail,	per lineal ft.	03
5-16 x 1⅜ Lattice Work,	per 100 ft.	60
5-16 x 1¾ Lattice Work,	per 100 ft.	75
⅞ x 1⅜ Balusters, D. 4 S.	per 100 ft.	1 00
⅞ x 1¾ Balusters, D. 4 S.	per 100 ft.	1 10
2¾ x 2¾ Balusters, turned up to 2 ft.		15
3¾ x 3¾ Balusters, turned up to 2 ft.		25
1⅛Bandsawn Balusters, finished, each		08
1⅜ Bandsawn Balusters, finished, each		09
1¾ Bandsawn Balusters, finished, each		12
5 x 5 Newells, turned tops, ¼ cut, up to 3.6 long, each		1 00
6 x 6 Newells, turned tops, ¼ cut, up to 3.6 long, each		1 25
5 x 5 Newells, turned tops, hearts in, up to 3.6 long, each		75
6 x 6 Newells, turned tops, hearts in, up to 3 6 long, each		90

	Toronto	Winnipeg	Montreal
CEMENT			
Bbl. lots in bags	$ 1 90	$ 2 00,-2 35	$ 1 85
Car lots F. O. B. Car	1 65	1 55	1 35,-1 40
1000 Bbl. lots	1 55		
Bags 40 cts. extra, refunded on the return of bags			
Small lots 10 cts. to 15 cts. extra for delivery on job			
BRICK			
Per M			
No. 1 Dry Red Pressed	17 00	33 00	21 00
No. 2 Dry Red Pressed	14 00		19 00
No. 1 Dry Buff Pressed	18 00	45 00	22 00
No. 2 Dry Buff Pressed			20 00
American Pressed			32 00-35 00
Red Stock, Inside	9 50		
Red Stock, Facing	12 00	23 00	
Grey or White Stock, Inside	9 50	11 00	
Grey or White Stock, Facing	11 00		17 00
Wire Cut for Foundations	11 00	45 00	
Porous Terra Cotta	30 00,-35 00	45 00	
Scotch and English Fire			
American Fire	28 00,-33 00		
No. 1 Enamelled		100 00	
LIME, PLASTER, ETC.			
Lime, Del. per cwt	0 38		0 40
Lime. Del. per car lot, per ton, F.O.B. Cars	7 60		8 00
Hydrated Lime, per ton, Del	10 60	12 00	13 00
Hard Wall Plaster, Sanded	4 50	12 50	4 75
Hard Wall Plaster, Unsanded	8 50		13 75
Plaster of Paris, per Bbl. of 300 lbs	2 15	3 10	2 00
Steel Channels, per 100	2 75,-3 00		
Expanded Metal, 10 gauge, per 100 ft	3 50		
BUILDING AND ROOFING SUPPLIES			
Tar Paper, 7-oz., 10-oz., 16-oz., per cwt.	1 60,-1 80		1 80
Tar Sheathing, per roll of 400 sq. ft		0 88	0 55
Dry Sheathing, No. 1 per roll of 400 sq. ft			45
Tar Fibre (or Dry No. 1), No. 2, per roll of 400 sq. ft	40	72	45
Dry Fiber No 2, per roll of 400 sq. ft	30		28
Ready Roofing, 2 ply, per roll of 100 sq. ft	70	2 00	70
Ready Roofing, 3 ply, per roll of 100 sq. ft	95	2 50	95
Roofing Tin Caps, per cwt	7 00	7 00	7 00
Roofing Wire Nails per cwt	6 00	4 15	6 00
Roofing Cement in Bbls, 40 gals			6 00
Roofing Cement small lots per gal			20
Roofing Cement Bbls., per cwt		3 25	
Coal Tar, per Bbl., 40 gals	3 50	5 00	4 00
Roofing Pitch, No. 1, per 100 lbs	70	1 00	75
Roofing Pitch, No. 2, per 100 lbs	60		60
ROOFING SLATES			
No. 1 Canadian 10 x 16 in., per square, F.O.B. Cars	$ 7 00		
Mottled Unfading 10 x 16 in., per square F.O.B. Cars	7 75		
Green Unfading 10 x 16 in., per square F.O.B. Cars	7 75		8 00,-10 00
Red Unfading 10 x 16 in. per square F.O.B. Cars	18 00		

SEWER PIPE		Toronto	Winnipeg	Montreal
Straight per ft.	4 inch	$ 0 07	$ 10½	07
	6 inch	10½	16½	10
	9 inch	21	29	21
Single Junction	4 inch		50	
	6 inch		70	
	9 inch		1 20	
Double Junction	4 inch		60	
	6 inch		1 00	
	9 inch		2 00	
Increasers and Reducers	6 inch		50	54
	9 inch		1 00	84
P. & H. H. Traps	6 inch		1 63	
	9 inch		3 25	
Bends	4 inch		35	23
	6 inch		50	38
	9 inch		1 05	84
Weeping Tile	2½ inch	01		
	3 inch	02		
	4 inch	03		

These prices are net, being 65% off list price. Car lots, 73% off.

	Toronto	Winnipeg	Montreal
STONE			
Crushed, F.O.B. Cars, per ton	$ 1 30,-1 35		$ 90,-1 00
Binder, F.O.B. Cars, per ton	1 40		1 50
Rubble, F.O.B. Cars, per ton	1 25,-1 30		50
Rubble, F.O.B. Cars, per toise	14 00,-15 00		
Brown Coursing, per yd., Del	3 25,-3 50		
Grey Coursing, per yd., Del	2 25,-2 50		
Brown Sills and Beads, in the rough, per ft., Del	35		

WINDOW GLASS UNITED INCHES	Toronto		Winnipeg		Montreal	
	Star	D.D.	Star	D.D.	Star	D.D.
10 to 25 per 100 ft. Box	$ 2 68	3 94			$ 2 81	3 74
26 to 40 per 100 ft. Box	2 93	4 26		5 50	3 02	4 04
41 to 50 per 100 ft. Box	3 21	4 73		6 50	3 53	4 72
51 to 60 per 100 ft. Box	3 38	5 36		7 50	3 74	5 10
61 to 70 per 100 ft. Box	3 63	6 15		8 50	4 00	5 53
71 to 80 per 100 ft. Box	3 94	6 93		9 50	4 42	5 95
81 to 85 per 100 ft. Box	4 41	7 88		10 50	5 02	6 67
86 to 90 per 100 ft. Box		9 45		11 50		7 74
91 to 95 per 100 ft. Box		11 03		13 50		8 42
96 to 100 per 100 ft. Box		12 92		16 00		9 35
101 to 105 per 100 ft. Box		15 12		18 50		
106 to 110 per 100 ft. Box		17 33		21 00		

PUTTY	Toronto	Winnipeg	Montreal
Bulk, in casks, per cwt	$ 3 00	1 90	
Bladders, in Bbls., per 100 lbs	2 25,-2 50	3 15	2 00
Bladders, in 100 lb. cases	2 75	3 40	

It is our intention, as soon as arrangements can be made, to also include in this page the markets of Halifax, Regina, Edmonton and Vancouver. We want to make The Builder and Contractor truly national in its field.

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to the Cement Show, to be held in Toronto, at the St. Lawrence Arena, March 6, 1911.

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